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Socioeconomic Issues of Health 1981

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SOCIOECONOMIC ISSUES OF HEALTH 1981

Robert A. Musacchio
Douglas E. Hough
Editors

Center for Health Policy Research
AMERICAN MEDICAL ASSOCIATION

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Foreword

This is the tenth annual edition of *Socioeconomic Issues of Health*. This volume and its companion, *Profile of Medical Practice*, are intended as reference guides for use by health professionals, policymakers, researchers, and journalists. Each brings together in one convenient source a combination of relevant essays and current data concerning the health care delivery system. Data included in *Issues* are abstracted principally from private and government sources; the data in *Profile* are collected primarily by the American Medical Association. Papers contained in each book include the contributions of authors from the research community at large as well as health researchers within the Center. The views expressed in the articles are the authors' interpretations of the issues discussed and are not intended as statements of AMA policy.

The Center for Health Policy Research trusts that this edition of *Issues* will be useful to all individuals with a general interest in the socioeconomics of health.

Lynn E. Jensen, Director
Center for Health Policy
Research
American Medical Association

Introduction

Over the years, Socioeconomic Issues of Health (SIH) has tried to serve the needs and interests of the varied population concerned with health care policy. This volume continues this tradition by presenting research on a wide range of health care policy topics. In particular, the contributions to this year's volume include both the "supply side" of medical care (manpower training, medical technology) and the "demand side" (smoking and health, health care expenditures by the elderly). These articles vary among literature reviews, policy papers, and technical economic presentations. We hope that this combination will interest the diverse audience to which SIH is directed.

Ronald M. Andersen, Gretchen Voorhis Fleming, and Lu Ann Aday begin the articles section of this year's volume with a discussion of "The Public's View as Input for Medical Manpower Training." In their paper they review the results of recent studies conducted at the University of Chicago on how the American public feel about the medical care they receive. The authors argue that the opinions and attitudes of the patient should be used, along with the expertise of health care specialists, in determining the need for health manpower training.

Next, James F. Rodgers considers an important aspect of the future environment facing physicians in his paper, "Trends in Physician Negotiations." Rodgers reviews the collective bargaining and negotiation experiences of physicians in Europe and the United States. He then examines how the changing environment (uncertain government regulation, the rise of competing physician organizations, and the increase in the number of employed physicians) will affect the prospects for, and the structure of, future negotiations by physicians and their representatives.

Many studies have found cigarette smoking to be associated with increased incidence of lung cancer, heart disease, and emphysema; that is, higher levels of smoking tend to increase health care costs. Howard Bloch and Roger Pupp, in their article "The Impact of Smoking on Health, Productivity, and Earnings: A New Collective Bargaining Frontier," demonstrate that the impact of smoking extends even to supposedly healthy, full-time workers: male smokers earn lower incomes than non-smokers, because of both lower wages and higher disability days. They suggest that, as a result, both unions and management may become more aggressive in discouraging on- and off-the-job smoking.

In the most technical, but potentially most illuminating, paper in SIH81, Jody L. Sindelar investigates the relationship between "The Value of Time and the Use of Medical Care." By considering medical care as both a consumption and an investment good, she finds that economic theory yields ambiguous predictions regarding the effect of an individual's opportunity cost of time on the demand for medical care. However, Sindelar demonstrates empirically that a predominantly positive relationship exists between the value of time and the demand for medical care. These results suggest that the demand for medical care in the United States will continue to rise as incomes rise and as health insurance becomes more widespread.

Paul L. Grimaldi, in "The Burden of Health Expenditures on the Elderly," challenges the common notion that inflation and the ever-increasing costs of medical care are placing an unacceptable burden on the elderly. He finds that although annual out-of-pocket expenditures on health care by the elderly grew from $300 in 1966 to over $600 in 1978, both their expenses net of inflation and their expenses relative to income actually fell during this period. Grimaldi cites additional evidence to suggest that the non-poor economic status of many of the elderly plus the rising costs of entitlement programs to this group may precipitate an economic clash between the young and the old.

The increasing number of people in the United States who are elderly, combined with the "death-with-dignity" movement, has generated an intense interest in this country in hospices. In a timely article, "An Economic Perspective on Hospices," Kim Carney investigates this trend and shows what economic analysis can say about the future of this kind of terminal health care. She finds that the growth of hospice care will largely be determined by the extension of third-party reimbursement (private insurance as well as Medicare) to this service.

Carol A. Szerszen concludes the articles section by examining the problem of regulation and medical technology. In her article, "Regulation of Medical Technology: Problems and Proposals," she focuses on two major issues: (1) efforts to formulate a comprehensive policy regarding medical technology are hampered by the high degree of uncertainty associated with the impact of this technology; and (2) almost all the participants in the health care system (physicians, patients, hospitals, and third-party payors) have a vested interest in encouraging the use of technology-based services rather than other forms of care. Thus, she concludes, those concerned with containing the rising costs of medical technology will continue to be faced with a difficult problem.

In the second part of the book, Socioeconomic Issues of Health 1981, as in earlier editions, presents a variety of socioeconomic data on health and health care. Fifty-nine tables and twenty-five figures detail information on: the characteristics of the U.S. population (including mortality and morbidity statistics), characteristics of the health services delivery system, national health care expenditures, financing mechanisms for the provision of health services, and medical education and medical manpower. These data will provide health care professionals, policymakers, and researchers with a readily available source of accurate and timely summary information on health and health care.

In total, the editors believe that the tenth edition of Socioeconomic Issues of Health offers our readers two things: a set of useful health care data, and a collection of thoughtful articles representing a broad spectrum of issues regarding the health care sector. Although we may not agree with some of the opinions expressed by the authors, we cannot quarrel with the quality of their reasoning or of their presentation of the issues. We hope that our readers will feel the same.

Finally, the editors wish to acknowledge a number of people within the AMA's Center for Health Policy Research whose efforts on this volume have helped to improve its overall quality. First, we wish to thank David J. Schroder for compiling the voluminous amount of reference material necessary to complete this edition. Second, we thank Lee Frack for her considerable efforts in coordinating the actual production process. Last, we are grateful to Lynn E. Jensen, Director of the Center, and James F. Rodgers, Director of the Department of Health Resource Analysis within the Center, for their helpful comments and advice.

Robert A. Musacchio
Douglas E. Hough
November 1981

Note to Prospective Authors

Socioeconomic Issues of Health seeks to provide a forum for policy-related research pertaining to the health care system. Authors who wish to submit an article to be considered for inclusion in the eleventh edition of Socioeconomic Issues of Health should send a brief abstract no later than March 1, 1982 to:

EDITOR
Socioeconomic Issues of Health
Department of Health Resource Analysis
Center for Health Policy Research
American Medical Association
535 North Dearborn Street
Chicago, Illinois 60610

The editor will respond to the abstract and send the author a copy of the style sheet for Socioeconomic Issues of Health. Three complete copies of the paper must then be sent to the above address by July 12, 1982. Manuscripts will be submitted to referees and the author will be informed of the decision shortly after receipt of the paper.

Part I
Selected Papers

The Public's View as Input for Medical Manpower Planning *by Ronald M. Andersen, Gretchen Voorhis Fleming, and Lu Ann Aday**

INTRODUCTION

This paper addresses the issues of what the American people think of their health care and how their opinions might be taken into account in evaluating U.S. physician manpower requirements. The previous involvement of health care consumers in the medical manpower distribution decision-making process has been limited to their medical care *experiences* (expressed demand, average travel time to facilities in an area, or time spent waiting to get an appointment, etc.). Rarely, however, have their *attitudes* and expressed "wants" provided direct input into this process. Consumer preferences have been applied only obliquely in the process of health manpower allocation decision-making -- through, for example, consumer involvement in health care delivery organization planning boards or reporting of studies of consumer attitudes toward the availability or convenience of medical services (Hulka *et al*. 1975; Ware and Snyder 1975).

It is conceivable that data relating to consumer wants could be taken into account in a methodology to determine manpower needs in much the same way as epidemiological and service requirements data are used. The purpose of this paper is to take a first step in that direction. We will present data which shows what the U.S. health care consumer likes (and dislikes) about what he or she is getting now. These analyses should provide an indication -- as do such shortage criteria as physician-patient ratios (Tokuhata *et al*. 1975; Schonfeld *et al*. 1972; Lee and Jones 1933) -- of the gap between "what is" and "what should be". The voices providing the evidence of this judgment are those of the consumer rather than of the "expert". In this way, the presentation that follows provides a counterpoint to the provider-based body of opinion that tends to dominate most of the work being done in this area.

THE DATA

Between September, 1975 and February, 1976, the Center for Health Administration Studies (CHAS) and the National Opinion Research Center (NORC) at the University of Chicago conducted interviews with 5,432 households representing the noninstitutional population of the United States. In each household an adult and a child under 17 years of age (if there was a child in the household) were randomly chosen, yielding a sample of 7,787 people. The selected adults were personally interviewed and a responsible adult, usually the mother, was interviewed for the child. The interviews covered experiences over the year preceding the interview including illnesses experienced, the care-seeking process, kinds and amounts of health services utilized, and satisfaction with the services received. The length of the individual interviews varied according to the illness experienced but averaged about an hour. The overall response rate for the survey was 85 percent.

---

*Ronald M. Andersen, Ph.D., is Director; Gretchen Voorhis Fleming, Ph.D., is Senior Research Associate; and Lu Ann Aday, Ph.D., is Associate Director for Research, Center for Health Administration Studies, Graduate School of Business, The University of Chicago. The data reported in the paper were collected in a national survey of access to medical care supported by The Robert Wood Johnson Foundation and the National Center for Health Services Research (HSR-230-76-0096). The views expressed in this paper are those of the authors and do not necessarily represent the official policy or position of the American Medical Association.

The questions tapping clients' general evaluations of medical care were gathered in a health opinions questionnaire administered to each adult respondent or proxy for the child sample person where there was no adult sampled in a family.[1] Therefore, while there are 7,787 respondents in the total survey, the general health opinions universe represents the total number of adults in the U.S. and includes one representative from each family. Of the 5,432 families sampled, 5 percent did not complete the health opinions questionnaire. The total number of cases analyzed is 5,135.

As a second effort to better understand access to care as defined by the consumers themselves, a set of questions was asked of all who had had a visit to a doctor during the past year, tapping their evaluations of specific aspects of the most recent visit. The number of cases considered in those analyses is approximately 5,300 (depending on the particular question asked).

ANALYSES OF DATA ON CONSUMER SATISFACTION

We will use information from the 1976 CHAS-NORC national survey of access to medical care to examine more explicitly what people want for their medical care. Our approach will be to consider the population's attitudes toward medical care in general and satisfaction and dissatisfaction with various aspects of their last physician visit. We shall review how the U.S. population feels about the availability of services, the convenience of the care they receive, the cost of services, the nature of doctor-patient relationships, and consumer perceptions of the quality of care they receive. On the basis of these levels of satisfaction, inferences will be drawn about what aspects of medical care practice people accept and what they would most like to see changed.

A subsequent question to ask is: What actual experiences do people have which lead them to be satisfied or dissatisfied? For example, how long are they willing to wait for a doctor's appointment, or sit in the doctor's office before they are seen, or pay out-of-pocket for a visit before significant dissatisfaction is expressed? By relating actual experiences to level of satisfaction we can better judge what remedial actions may be necessary to make medical care more acceptable to the population.

---

[1] There were a small number of families with a child but no adult interview from an additional sample of only people with illness episodes in the past year.

Even though a relatively high (or low) level of dissatisfaction may be expressed with a certain aspect of medical care, it would also be useful to know something about the relative importance of that aspect in shaping the consumers' overall view of the care received. Manpower and other health service programs should be directed toward those issues which evoke the most critical responses from consumers and are also closely associated with the general level of satisfaction with a particular visit or medical care in general. An examination of these correlations will constitute a third issue addressed in this section.

A fourth and final topic this analytic section will explore is the public sentiments specifically about health manpower and where they practice, including: (a) the settings for ambulatory care; (b) the types of practitioners that deliver that care; and (c) the number of practitioners and facilities which a community should have.

Levels of Satisfaction with Specific Aspects of Care Received

Summaries from our national survey reported elsewhere show that people are generally satisfied with the care that they receive (Robert Wood Johnson Foundation 1978; Aday et al. 1980). This finding has been confirmed in surveys using a variety of questions that are designed to tap commonly discussed complaints about services, such as costs of care, queuing problems, and issues surrounding the doctor-patient relationship (Hulka et al. 1975; Aday and Andersen 1975; Bellin and Geiger 1972; Pozen and Bonnet 1976; Tessler and Mechanic 1975). Financing concerns remain the greatest cause for dissatisfaction, followed by dissatisfaction with the convenience of care, especially the time patients have to spend waiting to see the doctor once in his/her office. The nature of the doctor-patient relationship itself generally draws less criticism than the cost and convenience aspects. Consumers also seem fairly well pleased with the overall quality of the care they receive from physicians.

Consumer dissatisfaction with out-of-pocket cost suggests that financing programs should be considered in concert with manpower programs to address all of the consumers' major dissatisfactions. Other dissatisfactions can be more directly influenced by manpower programs. Increasing physician-population ratios in under-doctored areas might reduce waiting time for an appointment in a doctor's office. Management techniques to reduce the lengths of patient queues might also be emphasized in physician training programs. Finally, a physician's education should include sensitization to the premium patients place on an unhurried doctor-patient contact with

Table I

Percentage of Those Who Saw a Physician in a Twelve-Month Period Who Were Dissatisfied with Various Aspects of the Most Recent Visit, by Nature of Experience

ASPECT OF RECENT VISIT	PERCENT DISSATISFIED[a]	
Travel time to the doctor's office	4%	(0.8)[b]
Less than 15 minutes	13	(1.1)
15 to 30 minutes		
30 minutes to 1 hour	37	(3.2)
More than 1 hour	35	(6.0)
Waiting time for an appointment		
Up to 2 days	9%	(1.0)
3 days to 2 weeks	21	(2.0)
More than 2 weeks	43	(5.0)
Office waiting time to see the doctor		
Up to 30 minutes	13%	(0.9)
30 minutes to 1 hour	59	(2.4)
More than 1 hour	85	(1.7)
Time spent with the doctor		
Less than 15 minutes	29%	(2.0)
15 to 25 minutes	11	(0.9)
More than 25 minutes	6	(0.8)
Information given by doctor about what was wrong		
A great deal	3%	(0.5)
A moderate amount	13	(1.2)
A little	35	(2.4)
Almost nothing	51	(3.4)
None	42	(12.0)
The out-of-pocket cost of the medical care		
$1 to $6	14%	(2.5)
$7 to $10	29	(1.8)
$11 to $15	39	(2.5)
$16 to $24	48	(3.4)
$25 and more	57	(3.0)

[a] Satisfaction for these items was elicited on a five-point scale ranging from "completely satisfied" to "not at all satisfied." The last three categories are combined here as the "percent dissatisfied."

[b] Standard errors of percentages are given in parentheses.

ample opportunity to discuss the patient's problem and how to deal with it. All of the above suggestions are based on the assumption that patient satisfaction is associated with actual medical care experience. We turn now to an exploration of that assumption.

Although people generally express satisfaction with their medical care, there are critical thresholds of experience beyond which they may begin to express dissatisfaction. Table I shows a range of actual experiences reported by patients together with the percentage of patients who are dissatisfied with those experiences. This table is limited to those who have had a medical visit in the year prior to interview, as these consumers are in the best position to evaluate specific, recent experiences in the medical care system. Also, previous analyses indicate that levels of satisfaction do not vary greatly by whether or not one has contacted a physician in the past year (Aday and Andersen 1975). Table I shows that dissatisfaction with the amount of time it takes to get to the doctor's office ranges from a low of 4 percent for those who required less than 15 minutes for their most recent visit to a high of 37 percent if the trip took 30 minutes to an hour.

How should the critical threshold point be determined for any given aspect of the patient care experience? One might decide on some absolute proportion of the population such as 25 percent or 50 percent, then define as the critical level of experience that level at which the agreed-upon proportion of the population become dissatisfied. Or, one could examine the data and choose a level of experience at which there appears to be a major increase in the amount of dissatisfaction. After examining Table I, our suggestion is that both may be applicable in this case. Experiences that leave about 30 percent or more of the population dissatisfied appear to be viewed quite differently (considerably more critically) than other levels of experience. Further, one might argue that a 30 percent dissatisfaction level is sufficiently high to suggest a potentially serious problem from a policy perspective. Regardless of the method chosen, there is an arbitrary element involved based on the underlying value judgments about which medical care experiences for the population are acceptable and which need to be improved.

Using the 30 percent level of dissatisfaction as a guide, we find the critical points for convenience aspects of the visit are 30 minutes or more for travel time to a doctor's office, between 30 minutes and an hour office waiting time once there, and a waiting time for an appointment of more than two weeks. The critical point for the out-of-pocket cost of the visit is about 10 dollars (in 1975 values). Concerning interaction with the doctor, the critical point appears to be reached if the doctor spends much less than 15 minutes with the patient or tells the patient little or nothing about the patient's problem.

If the problem definition is accepted (i.e., 30 percent dissatisfaction), a subsequent question is what is the magnitude of the problem? What proportion of people experiencing a visit are beyond the critical

Table II

Percentage of Those Who Saw a Physician in a Twelve-Month Period Whose Experience at the Most Recent Visit is Beyond the Critical Threshold

ASPECTS OF RECENT VISIT	CRITICAL THRESHOLD	PERCENT OF PATIENTS BEYOND CRITICAL THRESHOLD	NUMBER OF PATIENTS BEYOND CRITICAL THRESHOLD (IN MILLIONS)
Travel time	30 minutes or more	11%	15
Appointment time	Over 2 weeks	10	14
Waiting time	30 minutes or more	27	37
Time with doctor	Less than 15 minutes	28	39
Information from doctor	A little or nothing	27	37
Out-of-pocket costs	$10 or more	38	52

threshold for various aspects of the visit? These proportions are given in Table II, along with estimates of the numbers of people they represent. These proportions range from 10 percent for appointment time to 38 percent for out-of-pocket cost, with the latter proportion representing over 50 million people.

These data could, theoretically, be used to project manpower requirements just as expert opinion or current demand can be used. For example, if we know the proportion of visits having a duration which is less than the critical threshold, we could project the number of full-time equivalent physicians which would be necessary to bring all visits up to the minimal critical length. It should be pointed out that sometimes other criteria for manpower planning based on expert opinion or realized demand may conflict with those developed according to consumer preferences. For example, consumer judgments may suggest that many physicians are not spending enough time with their patients. On the other hand, some norms of physician productivity might suggest that even more patients should be seen by physicians in a given time period than is currently the case. Increasing "productivity" could conceivably result in increased dissatisfaction of patients. The optimal solution to this problem might involve efforts to somehow change the quality of the doctor-patient interaction so minutes spent with the physician prove more satisfying. It might also come down to a stark trade-off between higher provider productivity or greater satisfaction. At least, explicit consideration of consumer satisfaction makes such trade-offs clear.

What Aspects Contribute Most To Overall Dissatisfaction With Medical Care?

We have examined the public's satisfaction and dissatisfaction with a number of different aspects of their medical care. In planning health manpower training and medical care delivery programs, it is useful to consider how each of these aspects relate to the public's *overall* evaluation of the medical care they receive. If an important goal of the programs is to maximize the public's overall satisfaction, this approach tells us something about which aspects of care might be emphasized (i.e., those most closely associated with overall satisfaction).

Table III provides a ranking of various aspects of the last physician visit, based on the magnitude of the correlation between satisfaction with that aspect of the visit and how satisfied people were with the visit overall. The nature of the doctor-patient interaction appears much more important than issues of cost and convenience in determining patients' overall satisfaction. All of the patients' perceptions of how thoroughly, considerately, and humanely they were treated were more highly correlated with general satisfaction than were their judgments about waiting time and costs of the visits.[2] Thus, the earlier finding that patients are most dissatisfied with costs and waiting time must now be tempered by the suggestion that improving patient experience in these areas may not necessarily be the most effective way to increase satisfaction with medical care *overall*. Increasing the supply of physicians or providing more comprehensive third-party coverage of ambulatory care may reduce perceived problems of cost and convenience, but patients' overall assessments of their care appear more responsive to changes in thoroughness and consideration shown them by practitioners. These findings reinforce the need for physician training programs to emphasize approaches to humane patient treatment if, indeed, consumer perceptions are to play any consequential role in determining future medical manpower education policies.

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[2] Previous work has indicated that patients' evaluations of those features of care which pertain to technical quality as well as those which reflect the humane aspects of doctor-patient interaction tend to be highly correlated with each other and correlated to a lesser degree with aspects of care that are more distant from the physician's treatment, such as costs and waiting time (Aday and Andersen 1975; Aday *et al.* 1980).

Table III

Correlations for Those Who Saw a Physician in a Twelve-Month Period Between Satisfaction with Various Aspects of the Most Recent Visit and Overall Satisfaction with that Visit

ASPECTS OF RECENT VISIT		CORRELATION WITH OVERALL SATISFACTION[a]
General	Specific	
Humaneness	Amount of concern doctor had	.79
Quality	Quality of care provided	.77
Humaneness	Information from the doctor	.72
Quality	Amount of time spent with doctor	.70
Humaneness	Courtesy and consideration shown by doctor	.69
Humaneness	Courtesy and consideration shown by nurses	.57
Humaneness	Courtesy and consideration shown by receptionist	.53
Convenience	Amount of office waiting time before seeing the doctor	.48
Cost	Out-of-pocket cost for the visit	.47
Convenience	Amount of time for an appointment	.44
Convenience	Travel time to the doctor's office	.34
Cost	Cost of getting to the doctor's office	.28

[a] All correlations are significant at the .01 level.

Table IV

Percent of Adults Who Make Negative or Neutral Judgments About Aspects of Medical Care in General, by Type of Relationship with Source of Care

ASPECTS OF MEDICAL CARE IN GENERAL[a]	TYPE OF REGULAR SOURCE OF CARE			TOTAL
	Particular Doctor Named	A Place, but No Doctor Named	None	
Convenience of services	28% (1.0)[b]	33% (3.1)	53% (2.6)	32% (1.0)
Availability of services	60 (1.1)	63 (3.2)	64 (2.4)	61 (1.0)
Financing of care	74 (1.0)	75 (2.9)	86 (1.8)	76 (0.9)
Humaneness of doctors	29 (1.0)	41 (3.3)	47 (2.6)	33 (1.0)
Quality of care	35 (1.1)	43 (3.3)	49 (2.6)	38 (1.0)
General dissatisfaction	36 (1.1)	53 (3.4)	58 (2.5)	40 (1.0)

[a] These attitude scales are described in Aday et al. (1980). Persons whose responses averaged a neutral or more negative evaluation on the scale items are included in these percentages.

[b] Standard errors of percentages are in parentheses.

Satisfaction With Medical Manpower

Nine out of every ten people report they have a regular source of medical care. These people are generally much more satisfied with all aspects of their care than those who identify with no particular medical person or place (Table IV). Further, among those people with a regular source, those who can name a particular practitioner they usually see are more satisfied with convenience of service, humaneness of doctors, and quality of care than persons without a specific doctor. These findings are based on the entire U.S. population, not just those with a medical care visit in the past year. Thus, a medical manpower policy responsive to consumer wants would seem to advocate an established site of primary care for all persons and identify a particular practitioner as the prime coordinator of care for an individual or family at that site.

Among those people with a regular source, satisfaction varies considerably according to location, as shown in Table V. People who go to a private doctor's office or group practice are generally more satisfied than those who use outpatient departments, emergency rooms, or other clinics. Financing is viewed by all, regardless of location, as a major problem. Emergency rooms are commonly judged by professionals to be inappropriate places for the delivery of primary care. This judgment is supported by public opinion as well, since the emergency room users are more dissatisfied with their care than any other group. Consumer preferences, then, suggest that plans for future manpower needs should consider the necessary configuration of facilities and personnel to (1) move the primary care functions of emergency rooms to other sites; and/or (2) significantly alter the nature of primary care functions provided in emergency rooms and hospital outpatient departments.

Satisfaction with services received varies by characteristics of the provider as well as the location of service. When a particular physician was identified as providing care during the most recent visit, the specialty and age of the physician were determined from the American Medical Association's directory. Parents were generally equally satisfied with aspects of care provided to their children by family practitioners and pediatricians (Table VI). One difference between family practitioners and pediatricians was somewhat more dissatisfaction with out-of-pocket costs for the latter. Thus, consumer preferences for child care suggest little basis for emphasizing or de-emphasizing pediatrics or family practice -- particularly if some financing mechanism were developed to buffer the consumer against the higher costs of care from the pediatrician.

For adults, visits to internal medicine specialists tended to elicit fewer negative comments than visits to other specialties or to family practitioners (Table VI). These preliminary findings suggest that certain features of the practice of internists might be examined in more detail to suggest ways of minimizing patient dissatisfaction. These features might include: the nature and detail of information that various specialists tend to provide, the mix of services provided, referral patterns, continuity of care, and length of visit time. With respect to this last point, data from the American Medical Association's annual survey of physicians indicate that internists on average have longer visits with their patients than the other primary care specialties, i.e., general or family practice and pediatrics, although shorter visits than the surgical specialties, gynecology and surgery (Gaffney and Glandon 1979, pp. 208,217).

Table V

Percent of Adults Who Make Negative or Neutral Judgments About Aspects of Medical Care in General, by Location of Their Regular Source of Care

ASPECTS OF MEDICAL CARE IN GENERAL[a]	LOCATION OF REGULAR SOURCE OF CARE				
	Private MD Office	Group Practice	Outpatient Department	Emergency Room	Other Clinic
Convenience of services	28% (1.1)[b]	28% (2.7)	45% (4.3)	44% (10.5)	33% (5.9)
Availability of services	61 (1.2)	65 (2.8)	76 (3.7)	60 (10.5)	58 (6.0)
Financing of care	74 (1.1)	71 (2.7)	73 (3.8)	70 (9.8)	86 (4.1)
Humaneness of doctors	29 (1.0)	32 (2.7)	37 (3.8)	49 (10.7)	36 (5.9)
Quality of care	36 (1.2)	35 (2.8)	34 (4.0	50 (10.7)	43 (6.1)
General dissatisfaction	36 (1.2)	37 (2.9)	47 (4.3)	63 (10.2)	49 (6.2)

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[a] These attitude scales are described in detail in Aday et al (1980). Persons whose responses averaged a neutral or more negative evaluation on the scale items are included in these percentages.

[b] Standard errors of percentages are in parentheses.

The relationship between satisfaction with different aspects of the visit and age of the physician depends on the specific aspect considered. Table VI suggests that patients are more satisfied with waiting time for an appointment and out-of-pocket costs for visits to older physicians. For other aspects of the visit the relationships with the practitioner's age are less clear. There is little in this table to suggest that the more recently trained physicians are better able to meet perceived patient needs. Thus, if new training programs are to make physicians more attuned to patient wants, it may be that the selection and/or training process will need to change considerably from those employed in the recent past.

Although a large portion of the population as a whole feels that there should be more family doctors in their communities, this judgment is tempered by the actual family doctor-population ratio in the area. For example, in areas with the fewest family doctors, 61 percent disagreed with the statement, "there are enough family doctors around here," while in areas with the most family doctors the percentage dropped to 41. Feelings about specialists appear even more sensitive to the actual supply of specialists. In those areas with the fewest specialists, 54 percent of the public disagreed with the statement, "there are enough doctors in this area who specialize," compared to only 20 percent in areas with the most specialists. Further, the percent dissatisfied with availability of care decreases as one moves from areas with a relative shortage of primary care doctors to places where these practitioners are in greater supply. There is some reason to believe that consumer satisfaction scores may be responsive to general programs designed to increase the supply of providers.

COST IMPLICATIONS OF THE PUBLIC CONCERNS

"Cost containment" is a frequently expressed objective of much of current health policy decision making. We have previously argued for the social desirability of taking subjective consumer judgments into account in health care resource allocation processes. Can the consumer input and cost containment objectives both be realized in this process, however?

Detailed below are some possible cost implications of the public's concern about health care organization and financing documented above.

(1) The public validates the seriousness of the cost containment issue by expressing most dissatisfaction with the out-of-pocket costs of medical care. However, efforts to reduce direct costs to consumers may actually increase overall costs to the system. For example, comprehensive national health insurance providing first dollar coverage for doctor visits may well increase the demand for doctor visits and their unit costs (Newhouse et al. 1975). On the other hand, we have shown that, using one set of standards, 10 dollars for an office visit (in 1975 values) is the critical point at which 30 or more percent of the population as a whole are dissatisfied with the costs of care. National health insurance schemes might take information such as this into consideration in determining the level at which the costs will be covered. Out-of-pocket costs are, of course, also eliminated or greatly reduced by the health maintenance type of organization, which also shows some evidence of reducing overall costs through lower rates of inpatient utilization (Klarman 1969).

(2) A second major concern of the population, waiting time in clinics and physicians' offices, might be addressed by a number of programs, including providing more practitioners and facilities and

organizing practice management to reduce queuing time through improved scheduling or more efficient patient processing. Determination of the overall cost implications of such efforts is complex, but the production of more physicians may or may not have a mitigating influence on health care costs.

(3) The close association consumers make between overall quality of care and time and consideration given them by their practitioners documents the necessity for programs emphasizing the humaneness of patient care. Efforts to select and train practitioners attuned to patient personal needs may not have major cost implications. On the other hand, one element of the doctor-patient interaction patients particularly value is the time physicians spend with them. Longer patient visits which reduce patient dissatisfaction suggest higher system costs. Data from this study published elsewhere indicate that possibly more critical than the length of time with the doctor is the amount of information received from the doctor (Aday *et al.* 1980). Other findings suggest that patient compliance is positively related to satisfaction with the medical visit, particularly to information received from the doctor (Becker *et al.* 1974; Francis *et al.* 1969). Thus, there could be a potential cost savings if these patients are less apt to have a prolonged illness or recurrence of their illness due to their greater tendency to comply with the physician's regimen.

(4) It seems probable that satisfaction could be improved by providing all citizens with an established entry into the health care system. It is the fond hope of public health and community medicine interests that such a program could eventually be cost effective through an emphasis on prevention and early detection of disease with a corresponding reduction of expensive inpatient services. We know that having a regular source of care, receiving a preventive exam, and satisfaction with medical care are all positively correlated (Aday *et al.* 1980). However, in the short run, it seems likely that such a program would increase costs to the system.

(5) Our national studies have consistently demonstrated that volume of use of ambulatory care does not vary with patient satisfaction levels. We have also shown here that visits to emergency rooms and hospital outpatient departments elicit more negative responses and often have a higher average cost than visits to other facilities. Thus, it is possible that a shift in site of visits could have a positive effect on both costs and satisfaction levels.

(6) It is well known that one major factor in the increasing cost of medical care is the tremendous increase in malpractice suits (American Medical Association 1975). What was referred to in one report as a "national blizzard of litigation" (in malpractice) in 1974 amounted to 20,000 claims (*Newsweek* 1974). This represents a dissatisfied minority of roughly .01 percent of the U.S. population. Some researchers argue vehemently that the serious malpractice situation is the result of a "deterioration in doctor-patient relationships, a failure in communication ..." (Somers 1977). If this argument is true (although it rests on results other than a demonstrated link

between patient dissatisfaction and malpractice action), a level of even 10 percent dissatisfaction could signal a very costly problem.

To summarize, although we are in an era in which cost constraint efforts in medical care increasingly dominate the scene, it is also a time when the public's concerns are becoming more salient. In some instances, efforts to increase consumer satisfaction seem likely to lead to cost inflation rather than constraint. In others, it appears the two concerns may be complementary. In any case, explicit consideration of potential trade-offs between costs and consumer satisfaction should be an important component of informed decision making about health services resource allocation.

CONCLUSION

The thesis of this paper has been that the public's perception of the medical care it receives is a logical input into judgments about the kinds and numbers of medical manpower to be produced in future years. We have attempted to show the feasibility of using measurements of the public's attitudes toward medical care as well as more traditional criteria for determining manpower needs. We feel a health manpower projection model can include measures of consumer preferences as well as those of supply, demand, and expert judgments. What explicit role and what relative weight might be assigned to these public perceptions remains to be determined. What is clear, however, is that we are entering an era in which consumers are demanding a bigger part in structuring the health services they receive. Since medical manpower requirements are such a major part of that structure, it seems timely and appropriate to seriously explore the issues involved.

Table VI

Percentage of Those Who Saw a Physician in a Twelve-Month Period Who Were Dissatisfied with Various Aspects of the Most Recent Visit, by Characteristics of the Physician

CHARACTERISTICS OF PHYSICIAN	PERCENT DISSATISFIED WITH ASPECTS OF RECENT VISIT[a]				
	Waiting Time for an Appointment	Waiting Time to See the Doctor	Time and Cost to Get to the Doctor's Office[b]	Out-of-Pocket Cost of the Medical Care	Humaneness and Quality of the Visit[c]
Specialty of physician					
General or family practice					
- adults	14 (1.8)[d]	28 (1.6)	9 (1.0)	36 (2.0)	12 (1.2)
- children	12 (2.9)	25 (2.7)	11 (1.9)	27 (3.2)	9 (1.8)
Internal medicine - adults only	12 (2.8)	21 (2.4)	9 (1.8)	35 (3.2)	7 (1.4)
Surgery - adults only	18 (4.0)	27 (2.7)	13 (2.2)	35 (4.1)	8 (1.5)
Obstetrics and gynecology - adult women only	23 (4.6)	34 (3.2)	12 (2.3)	39 (4.2)	9 (2.0)
Pediatrics - children only	13 (2.5)	24 (2.4)	11 (1.7)	37 (3.5)	9 (1.7)
Age of physician					
34 or less	17 (4.2)	27 (3.5)	10 (2.6)	48 (5.2)	8 (2.2)
35-44	17 (2.0)	28 (1.9)	12 (1.2)	41 (2.4)	10 (1.3)
45-54	15 (1.7)	27 (1.5)	9 (1.0)	37 (2.0)	10 (1.0)
55-64	12 (2.1)	24 (2.0)	9 (1.4)	29 (2.5)	8 (1.1)
65 and over	10 (3.2)	26 (2.9)	8 (1.8)	28 (3.9)	9 (2.0)
All physicians	15 (0.7)	26 (0.9)	10 (0.6)	36 (1.2)	9 (0.6)

[a] See footnote a on Table I. [b] A scale based on satisfaction with the travel time to the doctor's office and satisfaction with the cost of travel to the doctor's office. [c] A scale based on satisfaction with time spent with the doctor, satisfaction with information given by doctor about what was wrong, as well as five other items concerning humaneness and quality of the visit. [d] Standard errors of percentages are in parentheses.

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Trends in Physician Negotiations

*by James F. Rodgers**

INTRODUCTION

Until recently, physicians' involvement in negotiation was largely confined to foreign countries with national health insurance (NHI). However, changes in the physicians services market have spawned a growth in negotiating activities among physicians in the United States. It now appears that we are entering an age of physician negotiations. Some of these negotiations will resemble traditional collective bargaining while others will be unique to medicine.

The purpose of this paper is to investigate the trends in physician negotiations with a view toward the institutions that may develop in the near future. First, I examine the current status of negotiations in medicine. Second, I discuss the environmental changes in the marketplace that are likely to affect the future of negotiations. Finally, I consider the structure of future negotiations.

COLLECTIVE ACTION BY PHYSICIANS

For many occupations the most common form of collective action is collective bargaining--negotiation between an employer and an employees' representative. Often this kind of representation is a formal, legally sanctioned activity, proceeding according to federal or state labor laws in the United States. For physician employees, this same avenue of representation is available (and has been used) for settling differences concerning wages, hours, and working conditions. Traditionally, self-employed physicians have been viewed as having control over their workplace and terms of employment, being constrained as any firm by the market. However, increased third party involvement in the medical sector has led to a reduction in control of some aspects of the workplace of self-employed physicians. Particularly when these third parties are large or organized, opportunities for an unconventional kind of negotiation--bargaining between a representative of self-employed physicians and a third party--arise.

Negotiations between physician groups and other parties dealing with all aspects of the "exchange" of physician services have increased recently both in the United States and abroad. These increased negotiating activities are of the conventional variety (i.e., collective bargaining) as well as the unconventional type. The involvement of physician groups in negotiations over fees has been ongoing in Canada and Europe. In general, the implementation of national health insurance has been the major impetus to organized medicine's movement into fee negotiation. However, this is not always the case. Attempts to implement national health insurance have been defeated in Switzerland, but the medical society in the Canton of Bern has been negotiating fees with the local sick fund (insurer) since 1911 (Glaser 1978, p. 121). In the United States, increased negotiation can be linked to the growth of physician employees.

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Negotiated Fees Abroad

The determination of wages and other terms of employment through collective action, as opposed to individual decisions in a classical free market, may arise due to an imbalance between buyers and sellers. Collective bargaining in the U.S. began because certain groups of employees felt that their personal situation could be improved by acting collectively rather than individually. This grass-roots motivation for collective bargaining is typical of the development of many national unions (Reynolds 1978, chapter 15). In contrast, the physicians' services market abroad, negotiation often developed because of the adversary relationship created by national health insurance or organized payors (Glaser 1978). Thus, the motivation for physician negotiations abroad appears to have started at the top.

In Canada, France, Belgium, and Germany, national health insurance allowed the government to become the sole payor of medical services. Once government became the employer, there were several ways in which the new monopsonist (government) could determine fees. Three extremes are as follows: (1) the government could unilaterally determine the prices it was willing to pay, allowing physicians to adjust their supply according to their reservation wage; (2) physicians could continue to establish their fees on an individual basis with government paying the tab; or (3) providers and payors could negotiate the terms of service. If the first method of setting fees were used, the government would direct resources in the health care system, with providers being more-or-less passive participants. The second method would place primary responsibility for directing resources in the hands of providers, leaving government with a more passive role. The third method requires an active role by both parties in the determination of prices. Generally the third method of fee determination has been chosen abroad; the identification of an employer or surrogate employer has led to fee negotiation.

Physician Negotiation in the U.S.

There has been limited opportunity for negotiation in medicine in the U.S. Negotiations by an organized group of physicians requires an organized adversary. Typically a "physician-firm" and a "patient-consumer" have arranged a trade of these medical services individually. While the bulk of physician services are arranged without the aid of formal negotiation, there have been a number of significant recent experiences with negotiation. Primarily these experiences are associated with the recent growth in the number of physician employees and their unions. Because most physician unions represent only one category of employee, each category will be discussed in turn.

Interns and Residents. Physicians have organized where the employer has been identifiable. The most significant area of activity has involved interns and residents serving in public and teaching hospitals. Early organizational efforts began in New York City in 1934 and spread with the development of the Association of Interns and Medical Students. Following the demise of this organization, national level housestaff activities were lean until 1970. However, local activity during the 1960s resulted in collective bargaining on behalf of housestaff in New York City hospitals, Boston City Hospital, Los Angeles County Hospital, and others (Gapen 1980).

The 1970s saw the emergence of national level activity with the establishment of the Physicians' National Housestaff Association (PNHA) and the American Medical Association's (AMA) Intern and Resident Business Section. By 1973, nine percent of Association of American Medical Colleges (AAMC) teaching hospitals had collective bargaining agreements with housestaff and another ten percent reported requests for such activity (Harmon 1978, p. 511). In Michigan, New York, Illinois, and California, housestaff organizations won "union" status from state labor boards. In 1974 the AMA endorsed the concept of collective bargaining for housestaff and outlined broad guidelines for contracts.

Although the relationship of interns and residents to hospitals includes many of the attributes of an employee-employer relationship, the application to these physicians of the National Labor Relations Act (NLRA) as amended in 1974 has been the subject of considerable legal controversy (Harmon 1978). In March 1976, the National Labor Relations Board (NLRB) ruled that housestaff did not qualify as employees within the meaning of the NLRA. Despite this ruling, several state courts rejected the NLRB position that housestaff are not employees.

In the most recently adjudicated case, Physicians' National House-staff Association (PNHA) vs Murphy, the U.S. Court of Appeals for the District of Columbia upheld the NLRB decision denying residents collective bargaining rights under the NLRA. The U.S. Supreme Court reviewed the case and upheld the appelate court's decision although it did not consider the issue of whether residents are students or employees (American Medical News 1981, p. 1). Thus, the original 1976 NLRB decision preempts state labor boards from assuming jurisdiction over housestaff in voluntary hospitals. In 1979 legislation (HR-2222) which explicitly would have extended the NLRA to house-staff failed to receive Congressional approval. None of these actions prevent public and voluntary hospitals from recognizing housestaff associations as collective bargaining agents.

Federal Physicians. There are three basic routes by which physicians become employees of the federal government: (1) through uniformed military service, or as a uniformed officer in the Corps of the Commissioned Public Health Service; (2) through employment with the Veterans Administration; or (3) as civil service employees of other federal agencies, such as the National Institutes of Health.

Veterans Administration (VA) physicians are currently paid according to a civil service system, although in 1975 these physicians were granted special bonus pay. Legislation extended this bonus plan through 1980, with the express intent that the administration present a permanent solution to the VA pay problem. The VA is caught between a cost escalation problem and the need for incentives to make up for shortages in full-time VA physicians.

Although VA physicians have the right to bargain collectively on some issues, they may not directly bargain for salaries. The PNHA has been active in organizing the housestaffs of VA hospitals and is also investigating the possibility of organizing attending VA physicians. PNHA suggests that the law may not preclude these physicians from bargaining on the mechanisms used to determine pay. In addition, the National Association of VA Physicians (NAVAP) has developed a salary package that they are seeking to have enacted. This organization is a professional association with apparently no active plans to bargain collectively for VA physicians.

However, NAVAP has signed a "Declaration of Joint Principles" with the American Federation of Government Employees (AFGE). AFGE affiliates, representing approximately 700,000 government employees, had participated in negotiations in forty hospitals in 1974 (U.S. Medicine, December 1, 1979, p. 1). Under the recent reform of the Civil Service Act, AFGE will now qualify at the national level as the bargaining representative of VA employees and physicians.

Physician Unions. The Union of American Physicians and Dentists (UAPD) is composed of approximately ten state affiliates with, they estimate, 22,000 total members. The most visibly active affiliate is the California UAPD, with approximately 8,000 members, some of whom are in private practice. The California "union," like its affiliates in other states, acts as an advocate for physician interests both on an individual and collective basis. The California UAPD offers to represent an individual physician's interests before Medicare and Medicaid or before a hospital credentials or utilization review committee.

The California UAPD is unique in that it actually serves as a union, or recognized collective bargaining agent, for approximately 2,000 California physicians. California UAPD has been recognized as the representative of physicians employed in certain neighborhood health centers. The state labor board recognizes UAPD as the bargaining agent on behalf of physicians employed by county health facilities and by the state university system's student health clinics.

Staff Model HMOs. Physicians salaried by staff model HMOs or group practices in which they have no significant proprietary interest can be identified as employees, and may bargain collectively (under NLRA) on wages, fringe benefits, and working conditions.

While informal negotiations in HMOs may occur frequently, the only known formal physician union for HMOs was formed at Group Health Association (GHA) in Washington, D.C. In 1976 the legitimacy of an inhouse bargaining council operating there since 1970 was challenged by GHA. The NLRB warned GHA that the arrangement might be considered a "company union" and, thus, illegal under the NLRA. Based on this warning GHA disbanded the council (Harmon 1978, p. 526).

Several alternative mechanisms for physician participation in decision making were considered. Orginally, the physicians favored a separate physician-controlled medical service corporation. This corporation would negotiate a contract to provide all medical services to the HMO on a fixed fee or capitation basis. Individual salaries would be internally determined by the physician group. The GHA Board of Trustees rejected this concept. In 1977 the NLRB granted physicians the right to a union election. After designation of the union, negotiations broke down. In 1978 the physicians "walked out" for 11 days. After bargaining and work were resumed, a second strike was narrowly averted by a contract agreement.

Self-employed Physicians. The NLRA mandates certain obligations for employers and employees engaged in collective bargaining. Self-employed physicians are not covered under NLRA, although negotiation is still possible if two parties so agree. Although rare, there have been instances in which a representative of a group of physicians has negotiated fees with a third party. Local medical societies were responsible for developing fee schedules of maximum allowances for the military's Dependents Medical Care Program of the mid-1950s. Negotiations took place between state or local medical societies and the program administrators (Robinson 1958). During the 1960s and 1970s another instance of negotiated fee schedules became institutionalized for a six county area of New York. Genesee Valley Medical Care, Inc., of Rochester, N.Y., a Blue Shield based plan, negotiates a fee schedule with the local medical society (approximately 1200 physicians) that is accepted as payment in full by all participating physicians. The negotiated fee schedule was challenged by the Price Commission under the Economic Stabilization Program (1973) and forced to roll back its negotiated 13.5 percent increase in its fee schedule.

ENVIRONMENTAL CHANGES

Changes in the physicians' services marketplace lead to changes in the costs and benefits of various kinds of collective action. The environment in which medicine is practiced in the United States is changing rapidly. Some of these changes result from external demands on the profession. Political changes such as the growth of government regulation are quite visible at the present time. A number of important changes are internal to the profession. The growth of specialization and the rapid increases in medical technology are examples. Each of the changes affects the physicians' services marketplace and directly or indirectly affects the amount and kinds of negotiation that occur in medicine. Some of these environmental changes are discussed below.

Impact of Government and Organized Adversaries

To some extent public policy has come to regard health care as a right rather than as a privilege. Some have argued that health care should be allocated on the basis of need instead of by a market system. These social demands have had a particularly strong impact on national politics. The federal government assumed a major role in financing health care with the passage of Medicare, while Medicaid assigned a major role to the states. The increase in utilization and costs, which were partially a result of this legislation, has led to further intervention in health care by both state and federal governments.

Over time it has come to be accepted by many involved in health legislation that further growth in medical services provided by government is not politically feasible or desirable without some control over cost. Government financing of additional hospital services is unlikely to be forthcoming without government control over hospital charges. Federal reimbursement of additional physicians' services is unlikely to occur without government control over fees. In fact, even without growth in government financing of medical services, there will continue to be demands for control over medical costs (Reynolds 1981).

Although initial impetus for negotiating activities usually develops at the local level, an exception may exist when one side of the medical marketplace has become concentrated and organized into a single unit, as has occurred abroad. In this case, the opposite side has organized or refocused the structure of its organizations in order to negotiate prices. National health insurance has led to fee negotiation between payors and organized medicine in a number of countries. Certainly the emergence of an organized adversary in the U.S. with, for example, the advent of some forms of national health insurance, could be expected to bring demands for fee negotiation. However, even now, there is concentration on the payor side by Medicare, Medicaid, Blue Cross/Blue Shield, and some commercial carriers, indicating potential demands for negotiating. An argument can be advanced that the potential for national-level negotiation exists in the United States today.

Actions are taken by all levels of government that affect physicians, but physicians often have no means of input as programs are generated. Reimbursement schemes are designed and fee schedules are set by third parties (insurers as well as government) without a formal means for each affected physician to be represented in the debate. Even professional judgment is not free of interference from outside parties. The only right that an individual physician has in the process is the right to refuse to participate in a program. And, even that right has been challenged in the State of New York (Pinto 1978, 1979). Under the circumstances, it should not be surprising that many physicians are seeking to be represented in formal negotiation with third parties.

As discussed earlier, a number of self-employed physicians have been joining unions in various states. A number of unions have been soliciting physicians to join their ranks by promising representation before various third parties. However, there are a number of unsettled issues concerning the legal ramifications of this movement. Since an organization that represents self-employed persons before third parties (who may be considered purchasers) may not satisfy the legal definition of a union, these union-minded physicians may be risking prosecution under antitrust law. Final resolution by the courts, however, cannot be predicted.

Specialization and Competing Organizations

A union tends to face the development of rival organizations when it fails to meet the changing demands of its existing or potential membership. This point is illustrated in the development of rival federations in American labor history. The American Federation of Labor (AFL) gained initial prominence by responding to the demands for representation along craft lines. With increased industrial growth shortly thereafter, demands arose for representation of industrial workers. The AFL did not respond to these changes in the environment and enabled the development of the Congress of Industrial Organization as a strong rival. Conflicts arose over jurisdiction and the voice of labor was divided.

A parallel can be drawn between these rival federations of the past and the development of organized medicine to date. The AMA traditionally has been structured along geographic lines recognizing regional variations and regional interests. At the time of the Flexner Report, the medical profession consisted primarily of general practice physicians. Following World War II, specialties grew in number and assumed added importance. Now, many specialty societies exist to meet these changing demands in the medical profession. Although specialty societies now have representation in the AMA House of Delegates (over 50 delegates), the AMA remains organized primarily along geographic lines (over 200 delegates). This situation contrasts with the structure of organized medicine in Belgium where representation in the negotiating body is about equally distributed between regional and specialty interest.

Employee Physicians

A growing minority of physicians practice in a setting in which an "employer" can be identified. They include approximately 20,000 federal physicians, 59,000 interns and residents, 2,000 physicians salaried by staff model HMOs, and 25,000 salaried physician teachers, administrators, and researchers (estimated from AMA surveys). Employee physicians may not out-number self-employed ones, but the fact that their concerns differ from the majority indicates their importance. Furthermore, governmental encouragement of alternatives to traditional fee-for-service medical practice is likely to continue to have an effect on the growth of salaried physicians and the amount and type of negotiations in medicine.

Table I
Physicians' Incomes and Relative Economic Position, 1970-1978

(1)	(2) Annual Average Net Real Incomes of Physicians (1967Dollars)	(3) Annual Average Net Money Incomes of Physicians (Current Dollars)	(4) Ratio of Physicians' Income to Private Non-Agricultural Workers
1970	$35,900	$41,800	6.7
1971	37,300	45,300	6.8
1972	37,700	47,200	6.6
1973	36,500	48,600	6.4
1974	35,300	52,000	6.5
1975	35,000	56,400	6.6
1976	34,900	59,500	6.5
1977	33,700	61,200	6.2
1978	33,500	65,500	6.2

Sources: Thirteenth Periodic Survey of Physicians. March 1979. Center for Health Services Research and Development, American Medical Association; Statistical Abstract of the U.S., 1979, U.S. Bureau of the Census.

Economic Conditions

Throughout the development of American labor unions, a deterioration in the personal economic condition of a group of workers has often occurred prior to their union activity. Low or declining wages and poor or deteriorating working conditions are determinants of unionization. The industrial revolution caused such conditions to occur in the U.S. and is associated with the labor union movement in America. The rise of unions for public employees and allied health personnel has been associated with wage changes below that in other sectors of the economy (Reynolds 1978, p. 608). Interns and residents in the United States have had much the same experience; their wages were particurlarly low relative to their long hours of work (Pointer and Carow 1974 and Hough 1981).

In Table I physicians' incomes are examined for the period 1970-1978. In terms of real purchasing power, average physicians' incomes have been declining slightly. In 1970 the average physician earned $35,900 (in 1967 dollars) which declined to $32,300 in 1978. In relative terms physicians' incomes have also declined. In 1970 the average physician earned 6.7 times as much as the average worker in the U.S. By 1977 this ratio had decreased to 6.2.

STRUCTURE OF FUTURE NEGOTIATIONS

Extrapolating these trends into the future suggests that the current structure of negotiations will not be viable for the coming decades. The current structure of organized medicine does not provide for the kind of representation that is likely to occur if government regulation of fees comes into being or if a large percentage of the profession become employees. What will be required in these hypo-thetical circumstances is a radical change in the structure of physicians' organizations. Though there are sufficient uncertainties that no one can predict with precision what the future environment and structure of organized medicine will be, it is likely that these trends will not be reversed.

In this section, I explore some of the structures for addressing the demands for negotiation in medicine in the future. The first part examines some institutions for dealing with fee negotiation under national health insurance (NHI). In the second part, I discuss an alternative set of structures that are likely without NHI.

Fee Negotiation Under NHI

In a number of countries abroad, institutions for fee negotiation are well-developed. In general, the negotiation process in Europe and Canada functions as a trilateral system. The insurers are organized and bargain directly with providers represented by organized medicine. After a fee schedule and other terms of service are determined, the agreement is presented to the government for ratification.

Negotiation experiences abroad encompass a variety of different structures.[1] In France, Belgium, and the Netherlands, negotiations are centralized, with organized medicine and insurers negotiating a national fee schedule. In Canada, Germany, and Switzerland, a federalist system has evolved in which provincial governments, insurance carriers, and medical associations have considerable autonomy in establishing re-gional agreements.

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[1] I rely heavily on Glaser (1978) for the following material on negotiations abroad.

In Belgium, the physicians' bargaining agent, called "The Federation," is a national union composed of five regional trade unions with the power to negotiate a national contract. To acknowledge professional differences, the "Federation" selects an equal number of representatives from general practice and specialties. In addition, the five regional trade unions are equally represented. The negotiation of fees and other terms of service takes place in the "Commission National Medico Mutualists" known as "Med-Mut." The Med-Mut is comprised of eleven members from the medical trade unions and eleven members representing the insurance carriers. It has the responsibility of negotiating the fee schedule and other terms of service, which is then submitted to the government for ratification.

In Canada, the health care system is organized by province with negotiation taking place separately within each province. The Canadian Medical Association (CMA) is a federation of ten provincial divisions. Since each province has its own bargaining agent and insurance plan, the CMA's role in negotiations is minimal; negotiation power resides with the provincial medical associations. For instance, Ontario physicians' fees are negotiated in the Joint Committee on Physician Compensation consisting of three representatives from the Ontario Medical Associa-tion (OMA), three representatives from the government of Ontario, and a neutral chairman. Within the OMA, the Committee on Economics reviews the economic position of physicians and drafts recommenda-tions to OMA's Board of Directors. The determination of fees for different specialties in Ontario is accomplished in this committee which has a large membership drawn from many specialties.

As the experience abroad has shown, certain aspects of any United States NHI plan requiring fee schedules will affect the likelihood of development of various institutions for fee negotiation. If a nationwide fee schedule were included in the plan, it is likely that one or more national physician organizations would be involved in fee negotiation. Either organized medicine would have to structure itself to deal with fee variation across specialties internally, or fees would have to be negotiated separately with representatives of each specialty. If physicians were not organized to deal with specialty disputes internally, national specialty societies would likely be the negotiating agents.

If fee schedules were allowed to vary by region, it is probable that state medical societies would assume a prominent role in negotiations. Although such a structure would be useful for dealing with geographic differences, it would be difficult for specialty differences to be resolved at the state level if specialty differences tended to be national ones. It is conceivable that the geographic and specialty issues might be negotiated by different organizations and at different levels.

Regardless of the NHI plan, institutions for dealing with specialty disputes will be required. Because the issues involved may be national ones, specialty societies, either directly or indirectly through the AMA, may play a role in fee negotiation. The role of state medical societies will depend upon how much geographic variation is allowed in the plan and upon how well the national organizations are prepared for settling regional differences internally. In any event, mechanisms for dealing with geographic and specialty differences must be included in the institutions for negotiating fees.

Institutions for Negotiation without NHI

Without an NHI plan, institutions for negotiations in medicine in the United States will be eclectic. The groups representing federal physicians are well established and are likely to continue in their negotiating roles. "Unions" for non-federal employee physicians are young and likely to experience many changes as more physicians leave the ranks of the self-employed. Among these groups, the current structure of housestaff associations appears to be the most enduring. Local housestaff associations have considerable, if not total, local autonomy in their collective bargaining activities. In contrast, few institutions have been developed for representing physicians employed by staff model HMOs. Of course, the usefulness of negotiating bodies that transcend individual employers depends upon the level of firm concentration reached in these markets. If a small number of physician employers dominates a market, it is likely that a role in negotiation might be assumed by regional medical societies or even national organizations. In California, the state medical association created a separate organization called the Public Practice Bureau (PPB) to represent physicians employed by the State of California. The PPB became affiliated with the California State Employees Association in 1981.

In addition, there will be significant pressure for negotiation with insurance carriers and government agencies while self-employed physi-cians constitute a majority. Although there are unresolved legal issues involved, there will continue to be pressure placed upon medical associations at all levels to assume a role in negotiating with third-party payors. As mentioned earlier, state and local medical societies have been involved in carrier negotiations, though much of it has been informal. The threat of antitrust legislation has contained growth of carrier negotiation for some time. It is likely that these negotiations will not greatly expand until the legal issues are resolved.

With or without NHI in the United States, negotiations in the medical profession will continue to increase and may have a profound impact on the structure of physician representation. With national health insurance, the likelihood of fee schedules increases the possibilities for internal disputes involving geographic and specialty differences. The institutions for resolving these disputes may be shaped by existing physician organizations, but are likely to alter the structure of organized medicine. With increased carrier negotiation or collective bargaining by the growing number of physician employees without NHI, it is probable that many separate institutions will develop for representing different groups of physicians on an employer, geographic, or specialty basis.

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The Impact of Smoking on Health, Productivity, and Earnings: A New Collective Bargaining Frontier

*by Howard Bloch and Roger Pupp**

INTRODUCTION

Increased concern is being expressed about the personal and social cost of smoking and other activities that adversely affect the health of workers. Smoking has traditionally been restricted at many work sites, but more recently, management has broadened its concern to include off-the-job smoking. The smoking habit is assumed to lead to increased absenteeism, higher medical and disability insurance premiums and losses in productivity (see Grossman and Benham 1973; Luft 1975; Bowen and Finegan 1969; Berkowitz and Johnson 1974). The City of Alexandria, Virginia, for example, in hiring firefighters, rejects all applicants who smoke; under Virginia law, if a firefighter has no heart or lung ailments when hired and subsequently develops such ailments, it is presumed that the problems are occupationally related, and duty disability payments are automatic (Robyn 1977, p. 5). Although they realize that smokers impose costs on non-smoking fellow workers, unions have been ambivalent about employer policies that discriminate against smokers. One reason for this caution is that the legality of such policies (i.e., the refusal to hire smokers) has not been adjudicated in most states (Robyn 1977, pp. 9-10).

In order to make rational judgments on the need for and desirability of anti-smoking programs, labor, management, and government decision-makers must be aware of the true cost of smoking. This study uses a two equation model to estimate the impact of smoking on health and productivity. We believe our approach is superior to that employed in prior studies for five reasons. First, most studies that estimate the effect of health on productivity have used self-reported evaluations of health in which the interviewee is asked to classify his or her health as good, fair, or poor, and to indicate whether there are any physical disabilities that affect the amount or kind of work which can be performed.[1] The responses to such a survey are highly subjective, and therefore difficult to evaluate; even more serious, they generate a statistical measure of health that is not continuous and therefore cannot be used to predict the changes in wages that are caused by small changes in health. This results in estimates that are

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[1] One exception is Bartel and Taubman (1979) who supplement self-reported evaluations of health with additional information from medical charts.

qualitatively correct, but quantitatively imprecise. We avoid this problem by using a continuous measure of health that is not self-reported.

Second, our methodology differs from that employed by previous authors, such as Luft (1975) and Berkowitz and Johnson (1974), in that we specifically differentiate between two related concepts - health and disabilities. Failure to make this distinction can cause one to measure inadvertently the impact of disabilities (rather than health) on wages. Third, other studies have generally assumed health to be exogenous, even though activities such as smoking and drinking clearly affect health. Health is explicitly recognized in this study to be endogenous and to be affected, in particular, by smoking. Fourth, the data we use are taken from a large disaggregated data set, whereas other studies of the impact of smoking on wages have used aggregated data. The disadvantage of using aggregated data to estimate micro-relations is well known (see Johnston 1972, pp. 228-238). Finally, previous studies have only measured the effect of poor health on market productivity; this study measures the effect of health on both market and non-market productivity.

The next section introduces the two equation model that is used to estimate the impact of smoking on health and wages. The following section describes the data used and the specific sample chosen for this study. The empirical results are then presented. The paper concludes with a summary and discussion of the implications of our findings for non-smoker hiring policies.

THE TWO EQUATION MODEL

Our model consists of two equations, the first of which estimates health, while the second estimates wages. A description of all the variables included in the model is presented in Table I.

$$\begin{aligned}
\text{I.}\quad \text{HEALTH} = {} & b_0 + b_1\text{SMOKE} + b_2\text{DRINK} + b_3\text{DRINK2} \\
& + b_4\text{INS} + b_5\text{AGE} + b_6\text{EDUC1} + b_7\text{EDUC2} \\
& + b_8\text{EDUC3} + b_9\text{EDUC4} + b_{10}\text{EDUC5} + b_{11}\text{EDUC6} \\
& + b_{12}\text{EDUC7} + b_{13}\text{EDUC8} + e_1.
\end{aligned}$$

$$\begin{aligned}
\text{II.}\quad \text{HOURWAGE} = {} & f_0 + f_1\text{HEALTH} + f_2\text{DIS} + f_3\text{AGE} + f_4\text{EDUC1} \\
& + f_5\text{EDUC2} + f_6\text{EDUC3} + f_7\text{EDUC4} + f_8\text{EDUC5} \\
& + f_9\text{EDUC6} + f_{10}\text{EDUC7} + f_{11}\text{EDUC8}
\end{aligned}$$

$$+ \quad f_{12}\mathrm{OCC1} + f_{13}\mathrm{OCC2} + f_{14}\mathrm{OCC3} + f_{15}\mathrm{OCC4}$$

$$+ \quad f_{16}\mathrm{OCC5} + f_{17}\mathrm{OCC6} + f_{18}\mathrm{OCC7} + f_{19}\mathrm{OCC8}$$

$$+ \quad f_{20}\mathrm{SIZE2} + f_{21}\mathrm{SIZE3} + f_{22}\mathrm{SIZE4} + f_{23}\mathrm{SIZE5}$$

$$+ \quad f_{24}\mathrm{SIZE6} + f_{25}\mathrm{REGION1} + f_{26}\mathrm{REGION2}$$

$$+ \quad f_{27}\mathrm{REGION3} + f_{28}\mathrm{UNION} + e_2$$

The model is patterned after the time allocation model developed by Becker (1965) in his seminal article, and extended by Boskin (1973), Hall (1973), and DeTray (1973). Becker maintains that the total budget (total income) of the household should include not only labor income, but also the value of leisure time. The opportunity cost of an hour of leisure time can be proxied by an individual's hourly wage rate; total income, then, is defined as labor time plus leisure time multiplied by the hourly wage rate. (In our reformulation of Becker's model, the sum of leisure and labor time must equal the number of healthy hours available.) This model explicitly recognizes that productivity is relevant for non-market as well as market activities. Following this approach, we postulate that smoking will affect total income by reducing both market and non-market productivity. The loss due to smoking will be estimated by calculating the difference in total income between non-smokers and smokers.

Our model is recursive; the first equation determines health, which is then entered into the second equation to determine wages. It is quite likely that simultaneity exists between health and wages, so that a simultaneous equation model with HOURWAGE also entered into the HEALTH regression might seem preferable. We rejected this approach for two reasons. First, the optimal specification of the health equation would include the total cost of medical care (to the individual), which equals the out-of-pocket cost for each visit plus the opportunity cost of the visit (the hourly wage multiplied by the time spent for the visit). Unfortunately, the information necessary to derive the total cost of medical care is not in our data set. Second, when HOURWAGE (the best available substitute for the total cost of medical care to the individual) is entered into the HEALTH equation, the empirical results are virtually unaffected. Under these circumstances, we believe it best to use the simpler of the two models.

There are other sources of simultaneity that are not addressed in our model. First, health is a function of medical care expenditures (and other variables), but expenditures depend upon the demand for and supply of medical care. Second, health is also a function of the time spent on activities such as exercise, and the value of the time spent is related to the hourly wage. Simultaneity occurs because the wage rate itself is correlated with health. Unfortunately, the data

Table I
Description of the Variables Included in the Model

AGE	Age, in years.
DIS	1 if a work disability exists which limits work activity, 0 if not disabled or if an existing disability does not limit work activity.
DRINK	1968 family drinking expenditures, in dollars.
DRINK2	DRINK squared.
EDUC1	1 if have 1 to 5 years of education, 0 if not.
EDUC2	1 if have 6 to 8 years of education, 0 if not.
EDUC3	1 if have 9 to 11 years of education, 0 if not.
EDUC4	1 if have 12 years of education, 0 if not.
EDUC5	1 if have 12 years plus non-academic training, 0 if not.
EDUC6	1 if have 12 years plus some college, 0 if not.
EDUC7	1 if have college degree, 0 if not.
EDUC8	1 if have advanced or technical degree, 0 if not.
HEALTH	The number of healthy hours in 1968, computed as the total yearly waking hours minus 16 hours for each reported sick day.
HOURWAGE	The hourly wage, computed by dividing the 1968 labor income by the number of hours worked in 1968.
INS	1 if have health insurance, 0 if not.
OCC1	1 if professional, technical or kindred worker, 0 if not.
OCC2	1 if manager, official or proprietor, 0 if not.
OCC3	1 if self-employed businessperson, 0 if not.
OCC4	1 if clerical or sales worker, 0 if not.
OCC5	1 if craftsman, foreman or kindred worker, 0 if not.
OCC6	1 if operative or kindred worker, 0 if not.
OCC7	1 if laborer or service worker, 0 if not.
OCC8	1 if farmer or farm manager, 0 if not.
REGION1	1 if live in the Northeast, 0 if not.
REGION2	1 if live in the North Central, 0 if not.
REGION3	1 if live in the South, 0 if not.
SIZE2	1 if city of residence is $\geq$ 100,000 but $<$ 500,000, 0 if not.
SIZE3	1 if city of residence is $\geq$ 50,000 but $<$ 100,000, 0 if not.
SIZE4	1 if city of residence is $\geq$ 25,000 but $<$ 50,000, 0 if not.
SIZE5	1 if city of residence is $\geq$ 10,000 but $<$ 25,000, 0 if not.
SIZE6	1 if city of residence is $<$ 10,000, 0 if not.
SMOKE	1 if smoke cigarettes, 0 if not.
UNION	1 if union member, 0 if not.

source we employed is not rich enough to allow us to model these simultaneous relationships.

It should be noted that the measure of health used in equation I is unusual because it is not self-reported. Rather, it is calculated as the number of waking hours in the year minus 16 hours for each reported work day lost due to illness. (It is assumed that the average person sleeps 8 hours out of each 24, so that the number of waking hours in a year are 5840.) We recognize that this approach injects two partially offsetting biases. Since many workers are granted a certain number of days of sick leave per year, it is likely that some healthy individuals will take time off from work to avoid "wasting" their accumulated sick leave. On the other hand, workers who are not paid for sick leave (or workers who are unusually diligent) may report for work even when ill. There is no information in the data set on sick leave insurance, so no control can be provided. Against this disadvantage should be set the major advantages of our measure of health: it is not self-reported, and it is a continuous variable which permits us to estimate the effect on health of small changes in the independent variables described above.

The independent variables in equation I represent factors that may cause health to improve or deteriorate. Smoking, drinking, and age are expected to be negatively related to health. DRINK2 is added to pick up non-linear effects of drinking on HEALTH. Since medical care and health are positively related, INS (which reduces the marginal user cost of medical care) should be positively related to HEALTH. Education is assumed to increase market and non-market productivity, so HEALTH should be positively related to all the education variables.[2]

The HEALTH equation is not fully specified. Andersen (1968) has shown that previous and current health status, family health history, attitudes towards risk and efficacy of care, and income are important in determining expenditures on medical care. In addition, ambient and occupational air pollution, diet (nutrition), and exercise have an impact (see Lave and Seskin 1972; Maturu 1979; McLean and Moon 1980). These variables are not available, so that the regression coefficients on the included variables may be biased, although the direction and magnitude of bias is not known.

The HOURWAGE equation (Equation II) is a typical wage generating equation, except for the inclusion of our unique measure of HEALTH as an independent variable (see Grossman and Benham 1973; Kalachek and Raines 1976). We maintain, as does Grossman (1972), that health increases both market and non-market productivity and should have a positive influence on wages. Smoking, therefore, affects wages by first decreasing health, which leads to decreased productivity. Various studies have shown that partially disabled people work fewer hours and also earn less than the non-disabled (see Luft 1975). Thus, we expect DIS to be negatively related to HOURWAGE. Age (a proxy for on-the-job training) and the eight education variables represent forms of human capital accumulation.[3] They should be positively related to earnings. Unionized workers are known to earn more, on average, than non-unionized workers, so the UNION variable should also be positively related to HOURWAGE (see Rees 1977). OCC1 to OCC8, REGION1 to REGION3, and SIZE2 to SIZE6 are control variables added to measure differences in wages due to occupation, region of the country, and city size.

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[2] This idea was developed by Grossman (1972). The excluded dummy variable for education represented people who cannot read or write; therefore, the expectation that health is positively related to all the remaining education dummies (which represent higher levels of education) is reasonable.

DATA

The data are taken from *A Panel Study of Income Dynamics* of the Institute of Social Research of the University of Michigan. The *Panel Study* is a large disaggregated survey data set containing information on smoking, drinking, disabilities, insurance coverage, the number of days lost from work due to illness, labor force participation, and demographic data for each year from 1967-1977. (The interview years lag by one.) The *Panel Study* was chosen because it is unique; the *National Longitudinal Study*, for example, which is used extensively in labor supply studies, does not include information on smoking and drinking.

Unfortunately, smoking information was available in the *Panel Study* only for the years 1967 and 1968. Data from 1968 were chosen for this study, because the 1967 sample was deliberately designed to over-represent low income groups, and a representative sample was desired. The 1968 sample includes 8293 white and 4882 non-white employed males between 18 and 65. Unemployed people were excluded due to the difficulty of assigning an imputed wage, and because the unemployed, obviously, could not report days of work lost due to illness (see Boskin 1973 and Hall 1973). Women were excluded because their labor force participation rates and hours worked were not as high as men's. (White and non-white females worked an average of 1099 and 961 annual hours, respectively. However, white and non-white males worked an average of 2363 and 2166 annual hours, respectively. This average is higher than might be expected, because only full-time workers are included.) It is quite likely that many females (especially white females) were secondary earners with a low attachment to the labor market. These factors would have made it very difficult to measure the impact of smoking on health, wages, and weeks worked for women.

We avoid econometric problems associated with the imputation of wages to the unemployed by deleting them from our sample. Unfortunately, this approach also deletes people whose unemployment stemmed from health problems associated with smoking; however, our analysis indicates that the resulting bias is small. Among all the male

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[3] Age minus education might be a better proxy for on-the-job training than age alone. We could not construct such a variable, because education is measured as a series of dummy variables, whereas age is continuous.

Table II
Empirical Results of Health and Wage Model for Whites and Non-Whites

EQUATION I-HEALTH

EXPLANATORY VARIABLE	WHITES		NON-WHITES	
	b	MEAN	b	MEAN
CONSTANT	5708.115 (162.670)		5629.660 (136.568)	
SMOKE	-25.105 (3.104)	0.598	-47.910 (3.154)	0.702
DRINK	0.036 (1.024)	94.984	2.296E-03 (0.036)	112.678
DRINK2	-1.529E-04 (5.595)	40420.438	-7.174E-05 (1.340)	48233.388
INS	150.950 (12.932)	0.869	105.870 (6.786)	0.722
AGE	-1.136 (3.126)	40.333	-0.272 (0.375)	40.397
EDUC1	-332.279 (9.088)	0.029	115.170 (4.091)	0.139
EDUC2	-58.114 (1.926)	0.173	1.969 (0.077)	0.251
EDUC3	-82.040 (2.710)	0.178	3.032 (0.115)	0.270
EDUC4	-9.404 (0.312)	0.212	54.438 (1.803)	0.130
EDUC5	-55.316 (1.776)	0.107	89.074 (2.268)	0.044
EDUC6	3.350 (0.109)	0.145	-77.426 (1.998)	0.046
EDUC7	2.575 (0.082)	0.094	86.888 (1.338)	0.012
EDUC8	9.180 (0.269)	0.044	119.832 (1.949)	0.014
		R^2=0.073		R^2=0.025
		F(13,8279)=49.950		F(13,4868)=9.410

Table II (continued)
Empirical Results of Health and Wage Model for Whites and Non-Whites

EQUATION II-HOURWAGE

EXPLANATORY VARIABLE	WHITES f	WHITES MEAN	NON-WHITES f	NON-WHITES MEAN
CONSTANT	-9.817 (4.703)		-7.267 (2.636)	
HEALTH	2.054E-03 (5.712)	5734.592	1.575E-03 (3.218)	5685.678
DIS	-0.350 (4.312)	0.083	-0.328 (3.160)	0.067
AGE	0.031 (15.026)		9.632E-03 (3.532)	
EDUC1	0.330 (1.345)		0.069 (0.560)	
EDUC2	-0.131 (0.766)		0.276 (2.816)	
EDUC3	0.173 (0.995)		0.473 (4.690)	
EDUC4	0.242 (1.420)		0.421 (3.438)	
EDUC5	0.383 (2.156)		0.137 (0.855)	
EDUC6	0.544 (3.117)		0.270 (1.781)	
EDUC7	1.647 (8.951)		0.725 (2.596)	
EDUC8	1.736 (8.455)		5.202 (19.292)	
OCC1	0.853 (5.935)	0.138	1.568 (6.236)	0.030
OCC2	1.355 (9.803)	0.117	2.167 (7.432)	0.011
OCC3	-0.564 (3.773)	0.060	-0.318 (1.123)	0.012
OCC4	0.215 (1.533)	0.095	0.394 (2.016)	0.061
OCC5	0.395 (3.051)	0.254	0.382 (2.110)	0.188

Table II (continued)
Empirical Results of Health and Wage Model for Whites and Non-Whites

EQUATION II-HOURWAGE	WHITES		NON-WHITES	
EXPLANATORY VARIABLE	f	MEAN	f	MEAN
OCC6	-0.178 (1.328)	0.182	0.219 (1.236)	0.312
OCC7	-0.710 (4.814)	0.068	0.068 (0.383)	0.342
OCC8	-0.960 (6.177)	0.054	-0.922 (3.730)	0.022
SIZE2	-0.384 (6.283)	0.214	-0.338 (4.939)	0.206
SIZE3	-0.482 (6.343)	0.133	-0.494 (5.416)	0.099
SIZE4	-0.231 (2.490)	0.065	0.711 (5.547)	0.047
SIZE5	-0.891 (11.432)	0.116	-0.759 (6.345)	0.055
SIZE6	-0.843 (11.926)	0.185	-0.667 (8.202)	0.158
REGION1	0.191 (2.680)	0.218	-0.118 (0.998)	0.087
REGION2	0.286 (4.369)	0.319	0.416 (3.912)	0.130
REGION3	-0.095 (1.396)	0.297	-0.279 (3.130)	0.684
UNION	0.606 (11.508)	0.326	0.677 (11.385)	0.352
HOURWAGE		3.736		2.505
		$R^2 = 0.310$		$R^2 = 0.289$
	F(28,8264) = 132.550		F(28,4853) = 70.270	

The estimated regression coefficients are b in Equation I and f in Equation II. The t-values are in parentheses below the regression coefficients.

workers in the panel study who were employed in 1968, 59.8 percent of whites and 70.2 percent of the non-whites were smokers. Among those who were unemployed the analogous figures were 54.0 percent and 58.2 percent. (The t-values for the differences in means were 3.43 and 6.37 respectively.) Because a greater percentage of the employed than of the unemployed are smokers, we conclude that health problems due to smoking do not typically lead to unemployment; it is very likely, however, that they may lead to disabilities (cancer, emphysema, etc.) which force total withdrawal from the labor force.[4] Unfortunately our data base, composed only of employed and unemployed workers, does not enable us to test this conjecture. We can say, however, that smoking-related disabilities do cause a measurable decrease in capacities of workers, and the resulting, relatively small individual losses cumulate into large losses for society as a whole.

EMPIRICAL RESULTS

Table II presents the results of the recursive regression model for whites and non-whites described earlier. The empirical results of the model conform closely to our expectations. The coefficients on INS, AGE, DIS, and UNION all have the expected sign, and all but one (the coefficient on age of non-whites in the HEALTH equation) are significant. The coefficients on the education variables in the HEALTH regression are puzzling; for EDUC1 to EDUC5 they are negative for whites, although only the coefficient on EDUC1 is significant. These variables perform better in the HOURWAGE regression. All the coefficients are positive, except for that on EDUC2 for whites which is negative but insignificant. In addition, both the size of the coefficients and their significance tend to increase along with the level of education. The negative (and very significant) coefficient on SMOKE indicates that white and non-white male smokers, respectively, can expect to lose 25 and 48 health hours per year due to their habit. The difference in the impact of smoking on the health and income of whites and non-whites may be due to differences in the amount or kind of cigarettes smoked or may stem from the interaction between smoking and other environmental or personal factors. Our data do not permit us to investigate this phenomenon, but we report white and non-white differentials separately to emphasize their existence in the hope of spurring future research.

The regression coefficients on DRINK and DRINK2 in the HEALTH regressions of Table II merit some discussion. Both of the coefficients on DRINK are positive, whereas those on DRINK2 are negative. This implies that a moderate amount of drinking (family expenditures on alcohol up to $118 per year for whites and $16 per year for non-whites) has the effect of slightly increasing health and wages, whereas heavier drinking (family expenditures greater than the above figures) will cause health and wages to deteriorate. This conclusion, although very interesting, is tentative and must be accepted with caution because the regression coefficients are not significant (except on DRINK2 for whites) at any normally accepted level. Also, the DRINK variable we used measures yearly family expenditures on alcohol; clearly, a measure of actual quantity of alcohol consumed by the worker himself would provide a superior estimate of the effect of drinking on health, but our data base did not provide this information.

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[4] The labor force includes employed and unemployed individuals, i.e. those working and those actively seeking work. Persons who are neither working nor seeking work such as retirees, housewives, and people who do not work because of disabilities, are referred to as being "not in the labor force".

The individual cost of smoking is defined as the difference between the total income of an average smoker and non-smoker. In this study we compute total income by multiplying the mean of labor plus leisure hours by the mean wage of white and non-white smokers and non-smokers. Since labor plus leisure hours equal health hours, we use the latter in our equations. The total sample mean of health hours is a weighted average of the mean of health hours of smokers (s) and non-smokers (ns) as presented in Equation (1).

$$\bar{H}_{total} = p\bar{H}_s + (1 - p)\bar{H}_{ns} \tag{1}$$

The weights on the means of smokers and non-smokers are the percentages of smokers (p) and non-smokers (1 - p) in the total sample, respectively. We know that the difference between the means of health for smokers and non-smokers is equal to the regression coefficient on SMOKE in the health regression as presented in Equation (2).[5]

$$b_{smoke} = \bar{H}_s - \bar{H}_{ns} \tag{2}$$

Substituting Equation (1) into (2) and rearranging terms, we obtain expressions for the means of health for smokers and non-smokers.

$$\bar{H}_{ns} = \bar{H}_{total} - pb_{smoke} \tag{3}$$

$$\bar{H}_s = \bar{H}_{total} + (1 - p)\,b_{smoke} \tag{4}$$

The mean hourly wage of the total sample is made up of the weighted average of the mean hourly wage of smokers and non-smokers (Equation 5). The mean for each group (smokers and non-smokers) is calculated by entering the values of all the independent variables for the groups into the HOURWAGE regression, then summing the resulting expression and dividing by the number of group members. The difference between the means (Equation 6) reflects the effect of smoking on wages.[6]

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[5] We are assuming that the regression coefficients on all other variables besides SMOKE are not statistically different between the races. Since we want to concentrate only on the differences in wages and health due to smoking, we feel that this assumption is justified.

[6] If the values of all the independent variables are entered into the estimated model by smoking status, and then summed and divided by the number of smokers and non-smokers respectively, we obtain:
$\bar{w}_{ns} = \bar{X}f + f_{health}\bar{H}_{ns}$ and $\bar{w}_s = \bar{X}f + f_{health}\bar{H}_s$. Assuming that the vector Xf (of all other variables besides HEALTH) is equal for both smokers and non-smokers, then the difference is as presented in Equation (6).

$$\bar{W}_{total} = p\bar{W}_s + (1 - p)\,\bar{W}_{ns} \qquad (5)$$

$$\bar{W}_{ns} - \bar{W}_s = f_{health}(\bar{H}_{ns} - \bar{H}_s) \qquad (6)$$

Again, by substituting Equation (5) into (6) we obtain expressions for the mean wages of smokers and non-smokers.

$$\bar{W}_s = \bar{W}_{total} - (1 - p)\, f_{health}(\bar{H}_{ns} - \bar{H}_s) \qquad (7)$$

$$\bar{W}_{ns} = \bar{W}_{total} + pf_{health}(\bar{H}_{ns} - \bar{H}_s) \qquad (8)$$

The means of health and wages by race for smokers and non-smokers are presented in Table II. Substituting the means into Equation (1) through (8), we derive estimates of the means of health and wage by race and by smoking status. (The differences between the means are significant, since the regression coefficients on SMOKE and HEALTH in the health and hourly wages regressions are significant.)

Table III

Mean Predicted Wages and Health by Race for an Average Smoker and Non-Smoker

	NON-WHITE	WHITE
MEAN HEALTH OF SMOKER (NUMBER OF HEALTH HOURS PER YEAR)	5671.401	5724.500
MEAN HEALTH OF NON-SMOKER (NUMBER OF HEALTHY HOURS PER YEAR)	5719.311	5749.605
MEAN HOURLY WAGE OF SMOKER	$ 2.483	$ 3.715
MEAN HOURLY WAGE OF NON-SMOKER	$ 2.558	$ 3.767
TOTAL YEARLY INCOME OF SMOKER	$14,082.089	$21,266.518
TOTAL YEARLY INCOME OF NON-SMOKER	$14,629.998	$21,658.762
DIFFERENCE IN TOTAL YEARLY INCOME (LOSS DUE TO SMOKING)	$ 547.910	$ 392.244

The total yearly income of smokers and non-smokers by race is calculated by multiplying the mean wage by the mean health hours; the difference between the total income of non-smokers and smokers is the loss due to smoking. All these estimates are presented in Table III. The cost of smoking includes the lost leisure time and lost non-market productivity, as well as lost market time and market productivity.

SUMMARY AND CONCLUSIONS

Using a 1968 data base that contains only employed males between the ages of 18 and 65, we conclude that the economic cost of smoking to an average white and non-white worker was $392 and $548, respectively.[7] These estimates include not only the value of lost labor time and decreased market productivity due to smoking, but also the value of lost leisure time and decreased non-market productivity. Other costs due to smoking such as increased health and disability insurance payments, premature death and increased morbidity, and the cost of growing, processing, and marketing tobacco products are not included in this estimate.

Although the data source used in this study is superior to other sources, it does have some limitations. If it had been possible, we would have preferred to use a smoking index rather than a dummy variable as our measure of smoking. A smoking index should include the amount and kind of cigarettes smoked, depth and duration of inhalation, and the length of the smoking habit. We believe that a smoking index would help to explain the difference between the size of the regression coefficients on SMOKE between the races.

A related topic which we believe merits further study is the cost of non-cigarette (pipe and cigar) smoking. A preliminary examination of our data indicates that the costs of non-cigarette smoking may be significantly higher than those of cigarette smoking. This is surprising, since the deleterious effects of non-cigarette smoking are believed to be less severe than those of cigarette smoking. Our result may be due to the fact that the average non-cigarette smoker is older than the average cigarette smoker, or that many who smoke pipes or cigars are previous cigarette smokers who changed their habit, perhaps because of health problems that were caused by cigarette smoking. Of course it may simply be that the harmful effects of non-cigarette smoking have been underestimated.

Although the results are quite tentative, our research indicates that moderate drinking may be associated with improved health and higher wages, but heavy drinking may correlate with decreased health and wages. We believe further study of this relationship should be pursued. Future research should focus not only on the cost of smoking and drinking, but also on the costs of obesity, nutrition, and exercise which may affect health and wages, and on the possible interactions among such characteristics.

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[7] These figures are in 1968 dollars; the amounts would have to be increased approximately two and one-half times to convert them to current dollars.

Some employers have attempted to curtail smoking by workers, because this activity is perceived to lead to higher indirect labor costs and decreased productivity. Our findings support this perception. Not only do smokers have lower on-the-job productivity, but also lower off-the-job productivity. Furthermore, non-smoking workers indirectly subsidize smokers to the extent that smoking-related illnesses and loss of productivity cause higher medical and disability insurance premiums, and depress the wage structure.

We conjecture that cross-subsidization between smokers and non-smokers should be more evident in unionized than in non-unionized firms, because unionized firms tend to have a more rigid wage structure, with less connection between individual productivity and wages. If this is true, then the loss of productivity due to smoking will have a more pronounced effect on the wages of non-unionized workers, and, conversely, the amount of cross-subsidization (of smokers by non-smokers) will be greater in a unionized than in a non-unionized firm. Unfortunately, our data were not extensive enough to allow us to test for these differences, but we suggest that this may be another fruitful area for future research.

Up to now unions have been ambivalent about non-smoking rules and non-smoker hiring policies. Our analysis suggests that a more aggressive posture (by both management and labor) to discourage on- and off-the-job smoking is clearly justified.

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The Value of Time and the Use of Medical Care *by Jody L. Sindelar*[*]

INTRODUCTION

Health insurance is increasingly important because of its tremendous growth and the consequent effects on society. Health insurance now covers more medical services, covers them more completely and for more people than ever before. Coverage continues to grow in all of these dimensions. For example, the number of people covered by insurance for physicians' care in 1978 is almost 55 times the number of people who were covered in 1940. In 1978, 181 million people had health insurance coverage and $36 billion were spent on health insurance (Source Book 1981). Increased health insurance coverage has been linked to the rising percent of GNP devoted to medical care, the higher than average inflation of the price of medical care goods and services, and, completing the circle, the consequent increase in the demand for insurance. These factors alone would result in society's concern with the demand for medical care and health insurance. However, there are other factors which strengthen this concern, for example, the increased awareness of the value of human capital as an investment and emphasis on productivity through good health.

Health insurance coverage reduces the out-of-pocket monetary price of medical care relative to the price measured in value of time. As the out-of-pocket monetary price of medical care falls relative to the time costs of utilization, the value of time becomes a relatively more important factor in the allocation of medical resources. The rising importance of the opportunity cost of time in the demand for medical care raises several issues, one of which is how medical care will be distributed when the monetary constraints are reduced and the value of time is the primary price in allocating medical care. The result of increased health insurance coverage may be a more equitable distribution of medical care to individuals by income, a possible social goal. However, it may also redistribute medical care on the basis of individuals' values of time. This may have possible adverse effects on society's productivity. Individuals with high productivity and thus high opportunity cost of time may find the time price of medical care relatively expensive. As a consequence, individuals with a high value of time may use less medical care than might be socially desirable. The price distortion that increases the time price relative to the monetary price may reallocate health care resources away from the most productive individuals.

This paper analyzes the effect of the individual's opportunity cost of time on the demand for medical care. A previously formulated model of the demand for medical care is used to predict, on a conceptual basis, the effect of an increase in the value of time on the demand for medical care. Comparative statics reveal that, without strong assumptions about the production function for health and other goods and services, the effect of an increase in the value of time or use of medical care is indeterminate because of offsetting effects. The net effect must be determined empirically. Using data from the Health Insurance Study,[1] this paper empirically examines the effect of the individual's opportunity cost of time on the use of physician, hospital, and dental care and on total medical expenditures.

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The effect of the opportunity cost of time on the demand for medical care is a relatively unexplored area. Previous studies have examined specific aspects of this issue, imposing strict assumptions on their models. However, there is no study of the general case, which provides empirical estimates and accompanying explanations of the effect of the opportunity cost of time on several types of medical care.

Grossman, in *The Demand for Health* (1972), provides the theoretical basis for most of the related empirical analyses. He formulates a human capital model of the demand for health and the derived demand for medical care. Medical care and own time are inputs into the production of health. An individual's stock of health depreciates over the life cycle. In response to these losses, the individual uses time and medical care to augment the depleting stock.

Grossman posits two motives for demanding health. One is the pure consumption desire for good health. Individuals derive direct satisfaction from their good health. In this case, health directly enters their utility functions. In contrast, with the pure investment motive, good health produces satisfaction indirectly. An individual loses productive time when sick. Good health increases the total productive time and thus increases satisfaction by increasing total resources available to the individual.

Using a selected subset of the 1963 CHAS-NORC data set, Grossman empirically analyzes the relevance of the consumption demand as compared to the investment demand for medical care. With pure investment demand Grossman predicts a positive impact of the value of time on the use of medical care. The pure consumption demand results in an indeterminate effect of the value of time on the use of medical care. Grossman's *a priori* belief in the investment demand is not substantiated by the empirical results.[2] Instead he finds a negative and often insignificant effect of the value of time on the demand for medical care.

In related empirical studies, Acton (1973, 1976) shows that time acts as a price mechanism in allocating medical care. Acton shows empirically that travel and waiting time act as prices in individual's use of medical care. Several other related empirical studies (Newhouse and Phelps (1976); Rosett and Huang (1973); Davis and Russell (1972); Rosenthal (1970); and Fuchs and Kramer (1973)) estimate price and income elasticity of demand for medical care. These studies focus on the monetary price and coinsurance rather than the time price of care. The results are not directly comparable because of different measures of utilization and subsets of the population used in estimation. These figures do, however, produce relatively consistent ranges of results. The price elasticity of hospital care ranges approximately from -.4 to -.5 for admissions and -.3 to -.5 for patient days. The price elasticity for physicians' care, whether measured in visits or expenditures, is in the range of -.1 and -.4 (with an estimate of -1.0 for outpatient visits as an outlier). Income elasticities for physicians' care range from about .6 to .9. The average estimate of income elasticity for hospital care is nearer to unity.[3]

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[1] For a more detailed discussion of the Health Insurance Study, see Newhouse (1974) and Orr (1974).

[2] One reason may be that Grossman's (1972) results are derived from a biased sample of the data set. He uses only white males who had experienced some sick time during the survey.

A CONCEPTUAL FRAMEWORK

Basic Framework

The theoretical framework for this study follows directly from Grossman's model of the demand for health and the derived demand for medical care. The explicit introduction of the use of time as an input into the production of health focuses on the value of time as a component of the price of medical care utilization.

The basic structure can be outlined briefly. In this paper, the structure is simplified to focus attention on the cross-section. Life cycle aspects are suppressed.[4] Health is assumed to be produced and consumed in one period. Thus, the concept of a depreciating stock of health is not used in this analysis.

The individual derives utility from his good health (h) as well as a composite of all other goods and services (Z):

$$U(h, Z)\,. \tag{1}$$

An individual produces health with his own time (t^M) in conjunction with purchased goods and services (M). For simplicity, medical care is considered to be the primary input purchased to produce health. This could readily be extended to include other factors of production such as food, housing, and exercise equipment. The production function for health can be written in the general form as:[5]

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[3] For a summary of estimates of price and income elasticities, see Paul J. Feldstein (1979, pp. 92-93).

[4] Life cycle aspects are suppressed here because the main concerns of this study can be analyzed using only cross-sectional data. In this simplified model it is assumed that health is produced and consumed entirely in one period.

[5] Grossman assumes production functions to be homogeneous of the first degree. This is the basis of many of his simplifying calculations.

$$h = h(M, t^M) . \tag{2}$$

An individual derives satisfaction from a number of other commodities. These can be summarized in a composite commodity (Z) which includes all commodities except health. The individual also produces this commodity with the purchase of goods and services (X) and his own time (t^x). The production function can be written as follows:

$$Z = z(X, t^x) . \tag{3}$$

The individual wants to maximize utility and will use all of his resources to produce the two commodities and achieve maximum satisfaction. The two constraints are limited resources of time and money. Total time (T) will be just exhausted by the use of time in the production of health (t^M), in the production of Z (t^x), and in the labor force (t^{LS}). The time constraint can be written as:

$$T = t^x + t^M + t^{LS} . \tag{4}$$

All of the monetary income is used to purchase medical care and all other market goods and services. With the market prices P_x and P_m and the exogenously determined wage rate (w), the income constraint is:

$$wt^{LS} = P_xX + P_mM . \tag{5}$$

Combining the two constraints (equations 4 and 5), the full income constraint can be written as:

$$wT = P_xX + wt^x + P_m M + wt^M . \tag{6}$$

The individual's constrained maximization problem can then be formulated in a single equation. The individual maximizes his utility subject to the full income constraint. The Lagrangian can be expressed as:

$$L = U[h(M, t^M), z(X, t^x)] + \lambda[wT - P_xX - wt^x - P_mM - wt^M] . \tag{7}$$

Investment Demand for Health

The investment demand for medical care can be incorporated into the basic structure by introducing time lost due to poor health. In the above formulation, good health provides direct satisfaction. In the investment framework, poor health reduces time available to produce goods and services and to enjoy those products. Time lost due to poor health can be reduced through the use of medical care by producing health. Time spent sick (t^s) is reduced by use of medical care:

$$\frac{\partial t^S}{\partial M} < 0 . \tag{8}$$

With the introduction of time lost due to sickness, the time constraint becomes:

$$T - t^s(M) = t^x + t^M + t^{LS} . \tag{9}$$

The full income constraint can be adjusted appropriately and the Lagrangian becomes:

$$\begin{aligned} L = U\{h(M, t^M), z(X, t^x)\} + \lambda\{[wT - wt^s(M)] \\ -P_xX - wt^x - P_mM - wt^M\} . \end{aligned} \tag{10}$$

In summary, in the individual's maximization problem, the individual allocates his resources to maximize utility subject to the production functions for health and other commodities, the budget constraints, and predetermined prices. Total resources available to the individual include both time and money. The relevant factor prices faced by the individual include the opportunity cost of own time, the price of medical care, and the price of other goods and services. The cost of producing health as well as the input mix chosen depends upon the feasible production set and the absolute and relative prices of the inputs, time, and purchased goods and services. Thus, individuals facing different efficiencies in production, input prices, and budgets will allocate varying amounts of time and money to the production of health.

Comparative Statics

This conceptual framework can be used to calculate the effect of the opportunity cost of time on the demand for medical care when holding all else constant. Standard methods of evaluating the partial derivatives can be applied to the individual's constrained maximization problem. This maximization problem is given by the Lagrangian (equation 10).

In the general case, the effect of the opportunity cost of time on the demand for medical care cannot be predicted. The sign of the partial derivative, $\partial m/\partial w$, is indeterminate because of several offsetting effects. The net effect of an increase in the value of time on the demand for medical care depends upon the relative magnitude of the income effect, the relative time intensity of medical care compared to the average commodity, the substitutability of medical care for time in the production process, and the investment demand for medical care. (See the Appendix for a discussion of comparative statics under alternative assumptions about the production function.)

An increase in the value of time increases the full income available to the individual. This increases the demand for all normal commodities, including medical care. However, there are various price and substitution effects. An increase in the shadow price of time also increases the composite price of using medical care. This effect alone decreases the demand for medical care.

An increase in the value of time also increases the composite price of all other commodities which have time as an input into the production process. The more time-intensive the production process, *ceteris paribus*, the greater the increase in the composite price when the value of time increases. Thus, with equal price elasticities of demand, the more time-intensive the production process, the greater the decrease in demand. If medical care is less time-intensive than the average commodity, an increase in the value of time would increase the demand for medical care. There is another substitution effect. An increase in the opportunity cost of time leads to a substitution of medical care for time as an input into the production of health. This substitution increases the demand for medical care, *ceteris paribus*.

Finally, in the pure investment demand for health, use of medical care decreases time spent sick and thus increases total productive time available. The more valuable the time, the greater the gain to a reduction in sick time. Thus, with the investment demand for health, an increase in the value of time increases the demand for medical care when all else is held constant.

SPECIFICATION OF THE ESTIMATION EQUATION

The Data Set

The data set used in this study is from the 1973-1974 baseline survey of the Health Insurance Study (HIS), a social science experiment.[6] For this pre-enrollment survey over 1,550 families (4,725 individuals) were randomly selected from the Dayton, Ohio area. Families were interviewed in person by trained survey researchers. To increase the accuracy of the data families were asked to have relevant documents available for verification and were paid for their participation. This one-year retrospective survey included questions about the medical care utilization of each individual by type of care, health status, family size and structure, wage rate, labor supply, income, and other socio-economic and demographic characteristics. Comparisons of the characteristics and utilization of medical care of this sample of the adult population to similar measures for census and other surveys suggest that this sample was representative of broader populations than Dayton, Ohio.

The current study uses data on the 2,805 adults in the sample population to analyze the effect of the opportunity cost of time on the demand for medical care. Only adults are used in the empirical analysis. Children are excluded for several reasons. The value of time for children is not a well developed concept and cannot be measured accurately. Furthermore, children may not be the relevant decision makers concerning their medical care utilization. In addition, adults' time is used when children use medical care, and this makes it even more difficult to analyze the relationship between the child's value of his own time and use of medical care.

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[6] See footnote #1.

Specification of the Empirical Analysis

The baseline survey is used to estimate the demand for medical care as a function of the relevant socioeconomic and demographic characteristics of individuals. In contrast to most other studies, medical care utilization is separated into three types of care: physician, dental, and hospital. The three categories are analyzed separately because they have different income elasticities of demand, are used to fulfill distinct health needs, and are used in different proportions by different socioeconomic groups. This separation strengthens the empirical results because the demands for these types of medical care are not homogeneous. Total expenditures on physician, hospital, and dental care are also analyzed empirically.

The demand for medical care is viewed as a two-part decision process: the initial decision whether or not to seek some of each type of care, and subsequent decisions about how much medical care to use. Search costs, uncertainty prior to an initial visit to the provider, and the possibility of providers' impact on the subsequent use of medical care justify separating the demand for medical care into two distinct types of decisions. Two estimation techniques are used here to correspond to the two-part decision. The decision whether or not to use some care is analyzed using the probit estimation technique. Use of medical care by those who chose to use some care is estimated using ordinary least squares.

Dependent Variables

Since there are two sets of empirical estimations corresponding to the two-part decision-making process, there are two types of dependent variables. (See Table I.) Dichotomous dependent variables are used in probit estimations. They take on the value of one if some care was used in the survey year, and zero otherwise. Continuous variables are used as dependent variables in ordinary least squares.

Several alternative measures were available for each of the continuous dependent variables for each type of care. From these, one variable was selected as the most appropriate measure of physician, hospital, dental, and total care. Utilization of physician's care is measured by total expenditures during the survey year. Expenditures include third party payments for physicians' services and ancillary services. Hospital care utilization is measured by the number of days spent in the hospital during the survey year. Days spent in the hospital

Table I

Definitions and Mean Values of the Dependent Variables Used in Probit and Ordinary Least Squares Estimations

Symbol	Definition	Mean	S.D.
	Probit[a]:		
WENTDOC	Proportion of the population which used physicians' care during the survey year	.80	.39
WENTHOS	Proportion of the population which used hospital care during the survey year	.14	.35
WENTDEN	Proportion of the population which used dental care during the survey year	.44	.50
USDMC	Proportion of the population which used some physicians', hospital, or dental care during the survey year	.88	.32
	Ordinary Least Squares:		
TCDOC	Total yearly expenditure on physicians' care for those individuals who used some care[b]	$129.4	173.5
DHOSP	Days spent in the hospital in one year by those who entered the hospital	11.4	18.0
TCDEN	Total yearly expenditure on dental care for those who used some care	$ 77.7	138.4
CHECKUP	Number of visits to the dentist during the survey year which were expressly for a checkup	1.2	1.1
TOTALMC	Out-of-pocket expenditure on physician, hospital, and dental care during the survey year	$130.2	230.5

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[a]These variables take on the value of 1 if the individual used care during the survey year, 0 otherwise. [b]Includes ancillary services and insurance payments but not physicians' services in hospitals.

Source: Health Insurance Study, Baseline Survey, 1973-1974. All subsequent tables come from this source.

is considered to be a better measure of utilization than either gross or net expenditures because the entire hospital bill is almost never paid entirely by the patient. Thus, individuals' recall of the gross cost is inaccurate. Net expenditure is not a good measure of total care used because out-of-pocket payment is typically a small portion of the total bill. Dental care is measured by total expenditures, including third party payments. Insurance is not as important in dental care, so that recall of gross expenditures tends to be more reliable.

Table II
Symbols, Definitions, Mean Values, and Standard Deviations of Independent Variables

	Adult Population (2751 Observations)		
Symbol	Definition (Type of Variable[a])	Mean	Standard Deviation
TIMEPRICE	Opportunity cost of time: cents per hour (S,I)	421¢	170
SICLEAV	Equals 1 if paid sick leave is available; 0 otherwise (D,I)	.42	.49
INCOME	Family income adjusted for inflation and averaged over two years (S,F)	$13,211	7,068
FS	Family size (S,F)	2.98	1.72
NKIDS6	Number of children under six years of age (S,F)	.32	.62
INSURE	Number of private health insurance plans (S,F)	1.33	.72
MCAID	Equals 1 if covered by Medicaid or Medicare; 0 otherwise (D,I)	.17	.37
EXHLTH[b]	Equals 1 if health is self-reported to be excellent; 0 otherwise (D,I)	.38	.48
FRPRHLTH	Equals 1 if health is self-reported to be fair or poor; 0 otherwise (D,I)	.17	.37
AGE	Age of the individual (S,I)	37.44	13.68
MARSNW[c]	Equals 1 if married, spouse present and not working; 0 otherwise (D,I)	.19	.39
MARSLF	Equals 1 if married, spouse present and in labor force; 0 otherwise (D,I)	.57	.49
RISK	Number of deaths per 100,000 individuals caused by accident, homicide, or suicide (S,I)	84.01	60.91
SEX	Equals 1 if female; 0 otherwise (D,I)	.57	.50
PREG	Equals 1 if individual was pregnant in the last year; 0 otherwise (D,I)	.02	.11

[a] S = scalar; D = dummy; F = family; I = individual. [b] The omitted category is good health. [c] The omitted category is not married or spouse absent.

Total medical care is measured by the sum of the out-of-pocket expenditures on all types of care. An accurate aggregate measure of utilization is difficult to obtain because of the problems in measuring use of hospital care. Days spent in the hospital is the best measure of utilization but cannot be compared directly to dollars spent on physician and dental care. Because of the weaknesses of this aggregate measure, results were compared to results using other measures of total care, and they were found to be consistant.

Independent Variables

The independent variables used in the empirical analysis are selected on the basis of the theoretical framework, using empirical findings of other studies.[7] The demand for medical care is considered to be a function of current health status, income, and prices. The price of health in this case includes components of the price of health produced at home as well as the value of an individual's time. Since the sample was selected entirely from the Dayton, Ohio area, all individuals are assumed to face the same market prices; therefore, market prices of all market goods and services need not be introduced as variables. The independent variables are discussed below. Table II shows the definitions, means, and standard deviations of these independent variables.

Opportunity Cost of Time. The shadow price of an individual's time is an important independent variable in this study. Market evaluation of time, i.e., the wage rate, is the proxy variable most commonly used as a measure of the value of time. Seventy-three percent of adults, 92 percent of the men, and 58 percent of the women in the sample were in the labor market. Thus, for almost 70 percent of the sample population a market wage rate could be recorded. For the remainder of the population, a good estimate of the value of time is not immediately available and has to be estimated.

The opportunity cost of time is estimated following the general procedures developed by Mincer (1962). Regression analysis is applied to the market wage rate and its determinants for all those individuals with a reported market wage rate. These results can be seen in Table III. Separate equations are estimated for men and for women because of possible differential effects of independent variables on the wage rate by sex. Coefficients estimated from these equations are then applied to the total female and male sample populations to derive an estimated opportunity cost of time for all individuals (TIMEPRICE). In this standard method of estimation, it is known that there is a selectivity bias introduced by using only those individuals in the labor force to predict the value of time for individuals who have chosen to remain out of the labor force. That is, one ignores the reasons why some individuals choose to remain outside the labor force even when controlling for relevant variables. However, it has been shown that

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[7] For a summary of the results from other studies, see Leopold and Langwell (1978).

Table III

Regressions of Reported Market Wage Rates for Women and Men Who Are Labor Force Participants

Dependent Variable: natural log of the reported hourly wage rate (in cents)

Independent Variables	Estimated Coefficient WOMEN	 MEN
Education	-.08546[a]	-.08205[b]
Education squared	.00488	.00349
Age[c]	.03186	.04749
Age squared	-.00054	-.00061
Education x Age	.00110	.00079
Previously married	.09149	.03491
Never married	.17857	-.12327
Excellent health	.03870	.08801
White	.42454	.21364
Non-white[d]	.45453	.06598
Constant	4.65259	5.24707
F	25.57	44.04
R^2	.27	.32
DF	11/759	11/1043

[a] All of these variables are significant at .995, except excellent health which is significant at .95.

[b] All of these variables are significant at .999, except previously married and non-white which are not significant at the standard levels of confidence.

[c] Age is used as a proxy for "work-experience" as data on experience are not available in the data set.

[d] The omitted category is those whose ethnic background was unobservable.

methods of correcting this potential bias have little effect on the empirical estimates of the value of time and thus are not incorporated in this study.[8]

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[8] See Heckman (1974, 1975) for a discussion of a method used to adjust for the selectivity bias.

In view of the known difficulties involved in estimating the opportunity cost of time, experiments are performed using various treatments of the opportunity cost of time to see if results are stable across methods of estimation of the use of medical care. Experimental alternatives include using only those individuals with a reported market wage rate in the estimations. This introduces the obvious selectivity bias yet can be used as one standard of comparison. Another procedure is to use a set of variables to measure the value of time. One variable takes on the value of the market wage rate when available and zero otherwise. The other variable is set equal to the estimated opportunity cost of time when the market wage rate is not available and equals zero otherwise. This method uses all of the available market wage rate and uses estimates for otherwise missing data. Furthermore, this procedure allows the coefficients on each of the two groups to vary. These experiments show that the various ways of measuring the opportunity cost of time give very similar results. Therefore, for consistency, only one method of measuring the opportunity cost (TIMEPRICE) is selected to be reported throughout the study.

Other Independent Variables. Availability of paid sick leave can reduce the individual's opportunity cost of being sick and often the time cost of visiting the physician. With employer-provided paid sick leave, the individual's opportunity cost of being sick or using medical care will be borne in part or in total by the employer. A dummy variable (SICLEAV) on whether or not paid sick leave is available to the individual is entered as an independent variable. This coefficient is predicted to be positive.

Family income averaged over two years and adjusted for inflation (INCOME) is used to measure the monetary budget constraint. Family, rather than individual, income is used because it may more accurately reflect the total resources available to the individual. In addition, it has a lower correlation with the individual's current health status and may be a better indicator of permanent income.

Family size (FS) is also entered as an independent variable. Family income is a better measure of resources available to an individual when family size is controlled for. Together they indicate income per person. It is predicted that family income will increase the use of medical care, whereas family size will decrease it, ceteris paribus. A variable measuring the number of children under six years of age (NKIDS6) is also entered as an independent variable. This variable is included for several reasons: young children are more likely to get contagious diseases and spread them to the rest of the family, and young children place demands on parents' time. Both could affect an adult's use of medical care.

The out-of-pocket cost of using medical care varies for individuals because of different health insurance coverage. Two variables are used to measure health insurance coverage. One is the number of private health insurance policies (INSURE) held by a family. The other is a dummy variable on whether (1) or not (0) an individual is covered by Medicaid or Medicare (MCAID). Both private and public insurance decrease the out-of-pocket cost of medical care, and are predicted to increase the demand for medical care. They are maintained as separate variables because of systematic differences in coverage.

Self-reported health status is entered in the estimating equation as a set of dummy variables: excellent health (EXHLTH) and fair/poor health (FRPRHLTH), with good health as the omitted variable. Health status is included because one would like to examine differences in utilization, given the same health status. This set of dummy variables is a standard measure and has been successfully used in other studies.

The age (AGE) of the individual is entered as an independent variable. Age can affect the demand for medical care in various ways. Measures of income may better reflect permanent income when controlling for age. Age also may be another measure of health status; self-reported health status may be best reported and interpreted when controlling for age.

Utilization of medical care is known to vary with marital status (Mechanic 1978). A set of dummy variables is used to measure the interaction of marital status and spouse's labor force participation. The latter is assumed to be correlated with the availability of home-provided medical care as a substitute for market medical care (Sindelar 1980b). The dummy variables used are: married with spouse present and not in the labor force (MARSNW), and married, with spouse present and working full time (MARSLF). (The omitted variable is not married or spouse not present.)

Based upon a previous study (Sindelar 1980a), a proxy variable (RISK) for the risk of loss of health from accidents, homicide, or suicide is used as an independent variable. The death rate by accidents, homicide, and suicide per 100,000 individuals is recorded for each age, sex, and race category. This rate is attributed to every individual who falls within the appropriate age/sex/race category. Thus, with the assumption that individuals receive at least part of their information about themselves from population averages, the variable provides an ordinal ranking of individuals by risk of death from violent causes faced by each cohort. This variable has been found to affect significantly the use of medical care.

Women use more medical care than men on average. Some of this difference is attributable to gynecological and obstetrical care, yet much remains even after excluding such care. A dummy variable (SEX) is used to control for some of these general differences. It takes on the value of one for females and zero for males. Another dummy variable (PREG) takes on the value of one if the person was pregnant during the survey year. It is equal to zero otherwise.

EMPIRICAL RESULTS

Both probit analysis and ordinary least squares analysis are used to estimate use of medical care for each type of care. The entire sample population is used in a probit analysis of the proportion of the population that used some of each type of medical care. Only those individuals who used some medical care in the survey year are used as observations in the ordinary least squares analysis of the amount of care used by these individuals. Expenditures on all types of medical care are estimated by ordinary least squares using observations on those individuals who used at least some physician, hospital, or dental care during the survey year.

Results from Probit Analysis

Table IV indicates that the estimated opportunity cost of time is a significantly positive factor in decisions as to whether or not to seek physicians' care, dental care, and whether or not to use at least some type of care. However, the effect of the opportunity cost of time on the decision to seek hospital care is insignificant. The coefficient on the value of time is most significant for the decision relating to use of dental care, followed by use of at least some medical care, physicians' care, and lastly, the insignificant result pertaining to use of hospital care.

The percentage change in the proportion of the population seeking each type of care due to a one percent change in the average wage rate ranges from .10 for physicians' care to 1.22 for hospital care. The latter, however, is based on an insignificant coefficient. These same elasticities are .58 for the proportion of the population using dental care and .15 for the proportion of the population using some of at least one type of care.

Results from Ordinary Least Squares Analysis

Decisions about how much care to use for those individuals who have decided to use some care are analyzed using ordinary least squares. These regression results can be seen in Table V. The coefficient on the estimated opportunity cost of time is significant in equations for the total expenditure on medical care. The coefficient is insignificant in all other cases.[9]

Four Possible Explanations of Results

The empirical findings are in contrast to the belief that individuals with a lower value of time will use more medical care because of their lower composite price (both of time and money) of using medical care. Holding everything else constant, the results show that an increase in the value of time increases the demand for medical care. In particular, it significantly increases the probability that an individual will seek some medical care. It is less significant in decisions as to how much care to use, given that the individual already decided to use some care. These findings alleviate concern that as the

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[9] Elasticities are not calculated for OLS results because the coefficients are primarily insignificant.

Table IV
Regression Results for Probit Analysis: The Decision to Use Medical Care

Dependent Variables	WENTDOC	WENTHOS	WENTDEN	USMDC
Independent Variables	Regression Coefficients (t-statistic)			
TIMEPRICE	.0007	.0002	.0015	.0014
	(2.21)	(.69)	(5.46)	(3.46)
SICLEAV	.1155	-.1116	-.0139	.1422
	(1.74)	(1.51)	(.24)	(1.87)
INCOME	.00002	.000006	.00004	.00003
	(3.00)	(1.08)	(9.98)	(4.78)
FS	-.1302	-.011	-.0597	-.1141
	(6.78)	(.51)	(3.35)	(5.19)
NKIDS6	.0988	.0156	-.0105	.0382
	(1.87)	(.26)	(.22)	(.63)
INSURE	.1116	-.0378	.0342	.0574
	(2.43)	(.78)	(.86)	(1.13)
MCAID	-.0627	.1202	-.2768	.0343
	(.70)	(1.29)	(3.36)	(.34)
EXHLTH	-.1633	-.2711	.1688	-.0125
	(2.54)	(3.70)	(3.00)	(.17)
FRPRHLTH	.3805	.6602	-.2178	.3992
	(3.98)	(7.64)	(2.62)	(3.81)
AGE	-.0072	-.0056	-.0081	-.0105
	(2.78)	(2.03)	(3.43)	(3.68)
MARSNW	.0745	.0069	-.0814	.1561
	(.75)	(.59)	(.87)	(1.41)
MARSLF	.1029	.2678	-.0759	.1364
	(1.27)	(3.00)	(1.05)	(1.50)
RISK	-.0019	.0004	-.0030	-.0019
	(2.65)	(.48)	(4.00)	(2.45)
SEX	.5106	.3526	.2867	.6795
	(3.80)	(2.33)	(2.32)	(4.27)
PREG	-.0203	.2910	-.0756	.3874
	(.07)	(1.18)	(.32)	(.84)
CONSTANT	.733	-1.400	-.7698	.5447
	(3.20)	(5.26)	(3.62)	(1.99)

Table V
Regression Results for Ordinary Least Squares Analysis: The Extent of Medical Care Utilization

Dependent Variables	TCDOC	DHOSP	TCDEN	TOTALMC
Independent Variables	Regression Coefficients (t-statistic)			
TIMEPRICE	.042	-.007	.0005	.092
	(1.56)	(.77)	(.01)	(2.08)
SICLEAV	-.805	.655	8.126	1.392
	(.33)	(.85)	(2.18)	(.35)
INCOME	.002	.00008	3.918	.002
	(3.51)	(5.33)	(.45)	(2.66)
FS	-3.067	-.429	3.087	-7.606
	(1.75)	(.07)	(1.24)	(2.77)
INSURE	18.723	-1.299	.942	8.810
	(3.25)	(.87)	(.14)	(1.27)
MCAID	-49.430	5.577	-14.694	-47.648
	(5.69)	(2.03)	(1.11)	(3.43)
EXHLTH	-17.680	-2.181	-.888	-29.955
	(2.86)	(1.00)	(.10)	(2.99)
FRPRHLTH	80.078	6.299	8.918	106.939
	(5.93)	(2.64)	(.59)	(7.70)
AGE	-.009	.051	1.015	.708
	(.04)	(.65)	(2.77)	(1.83)
MARSNW	7.863	-6.190	-27.393	-22.573
	(.78)	(1.70)	(1.79)	(1.43)
MARSLF	16.415	-3.970	-17.235	2.586
	(2.11)	(1.46)	(1.46)	(.21)
RISK	-.140	-.022	-.022	.38
	(1.75)	(.87)	(.13)	(.34)
SEX	28.748	-9.150	-0.937	64.559
	(2.21)	(1.93)	(2.56)	(3.01)
CONSTANT	37.413	31.347	18.024	16.246
# observations	2081	364	1241	2588
F-statistics	11.78	3.57	1.28	12.64

monetary price of using medical care decreases relative to the time component, people with low values of time will use relatively more care than the more productive individuals with a high value of time.

This finding of the predominantly positive effect of the value of time on the demand for medical care can be explained in various ways, some of which were discussed earlier. They include:

A) dominance of the income effect over the total price effect of an increase in the value of time;

B) substitution of purchased medical care for own time in the production of health as the value of time increases;

C) a lower than average time intensity of production of medical care (given zero or very limited elasticity of substitution), making the increase in the composite price of medical care less than the average increase in price; and

D) the dominance of the investment demand for health.

Explanations (B) and (C) could be mutually exclusive under certain circumstances. All other explanations are not mutually exclusive and may be additive in their impact. The full explanation may be composed of several of the stated factors. Furthermore, one explanation may better explain the results for one type of medical care than for another.[10]

Dominance of Income Effect Over the Substitution Effect. The increase in the value of time has both an income and a substitution effect. The positive income effect may offset the negative price effect. The income effect would be more likely to dominate, the less time-intensive the production process, and the greater the income elasticity relative to the elasticity of substitution. To investigate this possibility one can compare the time intensity and income elasticity for the different types of medical care analyzed in this paper.

Data from the Health Insurance Study can be used to rank physician, hospital, and dental care by time intensity. Physicians' care is shown to be the most time-intensive, followed by dental care, with hospital care the least time-intensive.[11] Estimates of the price elasticity of hospital care reveal a price elasticity of between -.4 to -.5 for admission to the hospital and -.3 to -.5 for days spent in the hospital. Price elasticities for physicians' have been estimated to fall between -.1 and -.4. Income elasticity for physicians' care is estimated to be between .6 to .9, with income elasticity for hospital care being closer to unity.

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[10] Other components of the explanation of the resulting set of coefficients may be found by examining the reasons for using each type of care. For example, hospital care, more than any other type of care, may be needed on a random and emergency basis. To the extent that the random loss of health is uncorrelated with the value of time, the importance of the value of time in decisions whether or not to use hospital care would be reduced. This may explain the insignificant coefficient on the value of time in estimates of the proportion of the population which uses hospital care. This, however, would not explain why the length of stay is not correlated with the opportunity cost of time.

[11] In the data set used in this study are data on time spent in seeking medical care by type of care. Used in conjunction with monetary expenditures on each type of care, one can derive the relative time intensities by type of care. Derivations of time intensities were calculated using various specifications of both the measure of time used in seeking care and measures of monetary expenditures. For example, total expenditures as well as out-of-pocket expenditures were used in calculating time intensities. Also, various combinations of travel, waiting, and appointment time were used to measure the time element of physician and dental care utilization. The ranking of physician, hospital, and dental care by time intensity was invariant to the specification used in calculations. This result adds validity to the resulting rank order by time intensity.

Thus, hospital care is the least time-intensive and has the greatest income elasticity of the three types of care studied. On the above stated grounds, one would predict that the increase in the value of time would be most likely to result in an income effect which would dominate the price effect. However, the coefficients on the value of time are insignificant for hospital care. This result does not support the explanation of the dominance of the income effect over the price effect. Although it does not refute the explanation, the evidence tends to contradict the predictions.

Substitution of Purchased Medical Care for Own Time. Another explanation of the positive coefficient on the opportunity cost of time is that as the value of time increases, the individual substitutes market medical care for this own, more expensive time. This explanation would be more likely to be found empirically, the greater the substitutability of factors in the production process. The elasticity of substitution cannot be estimated directly. However, there is some indirect evidence.

Individuals with a higher value of time seem to use medical care in a less time-intensive way and use relatively more of the least time-intensive types of care. Men, for example, use medical care less time-intensively on average than do women.[12] Men also use relatively more of the least time-intensive types of care--e.g., hospital care relative to physicians' care. This result suggests that there is some substitutability of factors: individuals may substitute toward use of medical care as their own value of time becomes more expensive. However, there is insufficient evidence to determine if the substitution effect dominates the income effect.

Medical Care Less Time-Intensive Than Average. Medical care may be less time-intensive than the average commodity. Thus, an increase in the value of time would result in a smaller increase in the composite price of medical care relative to other commodities, given similar elasticities of substitution by type of care. Therefore, holding all else constant, an increase in the value of time would increase the demand for medical care. To investigate this possible explanation, one should have data on the relative time intensity of medical care compared to all other commodities. Although data on the time intensity of all commodities are not available, time intensities by type of medical care constructed from the HIS data set can be used in the analysis. These data can be used to discover if the predictions of this explanation hold at least among types of care.

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[12] Based on time intensities by sex calculated from data from the Health Insurance Study.

Table VI
Regression Results for Ordinary Least Squares Analysis: Number of Visits to the Dentist for a Checkup

	CHECKUP	
Independent Variables	Regression Coefficient	t-statistic
TIMEPRICE	.0007	2.41
SICLEAV	-.032	1.05
INCOME	.0001	2.51
FS	.019	.95
INSURE	-.011	.20
MCAID	.088	.81
EXHLTH	.075	1.08
FRPRHLTH	.173	1.42
AGE	-.0003	.09
MARSNW	-.276	.12
MARSLF	-.216	1.47
RISK	.0002	.14
SEX	.276	1.53
CONSTANT	.463	
# observations	1241	
F-statistics	1.98	

Based on this hypothesis, the most time-intensive type of care would be predicted to have the greatest increase in its composite price. Given similar elasticities of demand, this result would imply that the most time-intensive type of care would also have the largest decrease in demand, holding all other things constant. Because hospital care has been found in this study to be the least time-intensive type of care, an increase in the value of time would be expected to have the largest and most significant positive effect on the use of hospital care, ceteris paribus.[13] Contrary to this prediction, the coefficient for the use of hospital care is never significant (but does take on a negative value).

Investment Demand. A fourth alternative explanation of the finding of a positive coefficient on the estimated opportunity cost of time is that the demand for medical care is primarily investment demand. Medical care would then be used to prevent time lost due to sickness and ill health. Holding everything else constant, the greater the value of one's time, the greater the loss caused by poor health. Thus, the higher the opportunity cost of time, the greater the demand for medical care to prevent loss of this valuable time.

An additional dependent variable can be introduced to study the existence of investment demand: the number of visits to the dentist in the survey year which are for checkups. This variable is used as a proxy for the demand for preventive care and for the investment demand for medical care. Although use of dental care may not prevent much lost time due to poor dental health, the number of visits for dental checkups may be correlated with the demand for other types of medical care which will prevent larger losses of time due to illness and which cannot be measured in this data set.

Based on the theory of investment demand for medical care, one would predict a positive and significant effect of the opportunity cost on the number of visits to the dentist for checkups, holding all else constant. Furthermore, if this is a better measure of investment demand, the effect of the value of time should be even stronger than evident in Tables IV and V above.

As predicted, Table VI shows that the coefficient on the estimated opportunity cost of time is positive and significant. In addition, the coefficient on the value of time is more significant for the number of checkups than for any other measure of the extent of medical care utilization (Table V). Also, as previously discussed, the probability that an individual seeks at least some dental care is significantly affected by the shadow price of time. These empirical results support the investment demand hypothesis.

CONCLUSIONS

The empirical results show a predominantly positive effect of the value of time on the demand for medical care. This finding is in contrast to the often expressed hypothesis that an increase in the value of time results in an decrease in the use of medical care. In general, holding all other things constant, an increase in the value of time results in a decrease in the use of medical care. The positive coefficient is more significant in the decision to use at least some care than in the decision as to how much to use, once the individual decided to use some care. In addition, the coefficient on the estimated value of time is more significant in equations for the use of dental care and less significant for use of hospital care.

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[13] Price and income elasticities for hospital and physicians' care are similar: both are inelastic. The price elasticities of demand have been estimated to fall in the range of .3-.5 for hospital care and about .15-.35 for physicians' care.

The predominantly positive effect of the value of time on the use of medical care could be explained in several ways. Among possible explanations are: a positive income effect larger than a negative price effect; the substitution of medical care for time; the lower time intensity of use of medical care relative to other goods; and the investment demand for medical care (those with a higher value of time have more to lose by not using medical care and staying in good health).

Two explanations are supported by the investigation. It appears that medical care may be used as an investment against future losses of time due to poor health. Thus, even though an individual with a high value of time faces a high price of utilization, he also faces loss of valuable time if he gets sick. Another possible explanation supported by the investigation is that as the value of time increases, people substitute purchased medical care for their own expensive time. Attempting to select one possible explanation over the other based on corroborative empirical evidence reveals some additional information: hospital care is the least time-intensive, followed by dental care and physicians' care.

POLICY IMPLICATIONS

The positive and frequently significant impact of the value of time on the demand for medical care has several implications for public policy formulation. Health insurance is covering more of the U.S. population, covering more medical services, and covering these services more completely. This coverage reduces out-of-pocket expense relative to the time price of using medical care. This price distortion could have an adverse effect on society through the misallocation of medical care.

As the out-of-pocket monetary cost of using medical care declines, the demand for medical care will increase, *ceteris paribus*. However, the demand will not increase by the same amount for all people. One factor affecting the distribution of medical care is the time price of medical care. The time cost of using medical care will increase in relative importance as insurance coverage grows. An individual with valuable time and who is very productive will face a relatively higher composite price of the use of medical care than the average individual. Thus, highly productive people could be predicted to use relatively less medical care than individuals with less valuable time. However, the predominantly positive coefficient on the estimated value of time suggests that this price distortion will have only a limited effect on the redistribution of medical care away from the highly productive. Holding all else constant, an increase in the opportunity cost of time will increase the demand for medical care.

The relationship is particularly strong for dental care and physician care.

This study's finding that the value of time is positively related to medical care alleviates some concern over programs designed to encourage the growth of health insurance coverage.[14] Furthermore, based on these results one might expect that a secular increase in the value of time could, holding all else constant, increase the demand for medical care.

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[14] Tax policy subsidizes the purchase of health insurance. See Martin Feldstein (1981) for a discussion of the effect of tax subsidies of health insurance.

Appendix

The partial derivative, $\partial m / \partial w$, is indeterminate in the general case. Further restrictions can be placed on the model to obtain unambiguous predictions under different assumptions.

Three alternative assumptions about the elasticity of substitution are analyzed here. The production functions for both health and the composite commodity, z, are alternately assumed to be linear, Cobb-Douglas, and fixed technical coefficients, with the range from perfect to zero elasticity of substitution. The intermediate case is a Cobb-Douglas function with an elasticity of substitution of one.

General Case:

$$\frac{\partial m}{\partial w} = \frac{\lambda w P_x h_{Mt^M} z_{xt^z} - (T - t^M - t^z) P_M U_{zz} (z_{xt^z})^2 h_{t^M t^M} - w^2 z_{xx} h_{Mt^M} \lambda}{\left| h_{t^M t^M} P_M^2 U_{zz} (z_{xt^z})^2 - w^2 z_{xx} U_{hh} (h_{Mt^M})^2 \right|},$$

where notations such as $h_{t^M M}$ are second partial derivatives, $\frac{\partial^2 h}{\partial t^M \partial M}$.

Assumptions placed on the production function:

Production function	Elasticity of Substitution	Partial Derivative
Linear		
$h = a_1 \cdot t^M + a_2 \cdot M$	∞	$\frac{\partial m}{\partial w} = \frac{a_1}{b_1} \frac{1}{Px} (T - t^M - t^z) > 0$
$z = b_1 \cdot t^z + b_2 \cdot X$		
Cobb-Douglas		
$h = t^{M\alpha} M^{1-\alpha}$	1	$\frac{\partial m}{\partial w} = T \frac{(1-\alpha)}{P_M} > 0$.
$z = t^{x\beta} X^{1-\beta}$		
where: $0 < \alpha, \beta < 1$		
Fixed technical coefficients		
$h = a\, M/t^M$	0	$\frac{\partial m}{\partial w} \gtrless 0$ as $\frac{t_Z}{X \cdot Px} - \frac{t_M}{M \cdot P_M} \gtrless 0$
$z = b\, X/t^z$		

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The Burden of Health Expenditures on the Elderly *by Paul L. Grimaldi*[*]

Numerous questions have surfaced recently regarding the nature and scope of the financial burden that health expenditures impose on persons 65 years and older. How large is it? Are all elderly persons affected uniformly? Are the expenditures as onerous as is often assumed? Could older persons spend more out-of-pocket for health care without facing reduced accessibility to needed services? Answers to these and related questions are important because soaring costs are challenging the viability of contemporary health-care strategies for the aged. Specifically, taxpayers are encountering increasing difficulty in subsidizing services under prevailing arrangements--a difficulty that almost certainly will intensify in the near future as the forecasted growth in the number and average age of older persons materializes.

This paper begins by exploring the aged's health expenditures. It then analyzes the burden of these expenditures to an extent permitted by available information. The results show that total and out-of-pocket per capita spending have risen dramatically since Medicare and Medicaid were implemented in the mid-1960s. They also indicate that many elderly persons are poor and definitely need assistance in paying for health services. However, contrary to what many people routinely assume, the overall burden of health expenditures has declined since 1966 because average income of the elderly has increased faster than out-of-pocket spending. Furthermore, a review of income, wealth, and spending patterns suggests that many older persons could pay a larger portion of their health bills without incurring serious hardship. These findings, coupled with the anticipated growth of the elderly population, counsel against the enactment of new social programs that entitle all elderly persons to health services. They also buttress--partly for equity reasons and partly because of fiscal constraints--arguments to increase Medicare copayments and to include a means test among Medicare eligibility provisions.

HEALTH SPENDING

Personal health expenditures have risen markedly since the mid-1960s, from $36.2 billion in fiscal year 1966 to almost $168 billion in calendar year 1978.[1] Over the same period, health outlays for elderly persons rose at an even faster pace, from $8.2 billion to $49.4 billion, which pushed the elderly's share of personal health expenditures from 22.7 percent in 1966 to 29.4 percent in 1978. And, as column 2 of Table I indicates, the aged's per capita expenditures jumped from $445 in 1966 to $2,026 in 1978. In contrast, spending for persons under 65 increased from $155 to $597.

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[1] No attempt was made to determine whether services received matched needs. To be sure, instances of overutilization and underutilization occurred. Also, the year an expense was paid was not necessarily the year of service. Unless noted otherwise the data in this section are from sources cited in Table I and U. S. DHEW (1976).

Almost 43 percent of the aged's spending in 1978 was for hospital care, followed by 25.6 percent for nursing home care, 18 percent for physicians' services, and 6.5 percent for drugs and drug sundries. In 1966, however, forty percent of health expenditures for the aged went for hospital care, 20.1 percent for physicians' services, 15.4 percent for nursing home care, and 14 percent for drugs and drug sundries. In general, dental services, eyeglasses and appliances, and other services each accounted for no more than 3 percent of total personal health expenditures for the elderly in 1966 and 1978.

The rise in health expenditures was not accompanied by a concomitant financial strain on the elderly because a large proportion of their bills was paid by third parties. Government--primarily through Medicare and Medicaid--absorbed 63.2 percent of the aged's outlays in 1978, down slightly from 64.5 percent in 1976, but more than double the 29.9 percent in 1965. Further, the proportion reimbursed by the public sector varied noticeably across services. In 1978, federal, state, and local governments absorbed almost 88 percent of the aged's expenditures for hospital care, 59 percent for physician care, 16 percent for prescriptions, and 3 percent for dental care.

While government's share of the bill was increasing considerably, the proportion paid by private insurance and other non-government third parties tended to fluctuate between 5 and 7 percent. On balance, the growth in the incidence of third-party coverage led the aged's per capita annual direct spending to rise approximately 95 percent, as compared with 292 percent for the aged's total per capita spending. Indeed, as column 3 of Table I shows, per capita direct spending--or total out-of-pocket expenditures less insurance premiums--rose from $237 in 1966 to $463 in 1977. These amounts rise to $300 and $613, respectively, after premiums for private insurance and Part B Medicare coverage are added to direct spending.

In 1977, almost $37 of the $463 spent directly by the aged went for hospital care, up from $14 in 1970. Relatively low beneficiary out-of-pocket expenses for hospital stays were, and continue to be, the intended result of the Medicare and Medicaid programs. Indeed, low expenses are a motivating factor behind the tremendous upsurge in hospitalization. Between 1965 and 1978, days of hospital care per 1,000 aged persons rose 21.5 percent, versus 1.8 percent for the entire population; surgery rates rose 64.7 percent and 25.5 percent, respectively (U.S. DHHS 1980, pp. 106-107).[2]

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[2] Since hospital utilization after age 66 increased approximately 3 percent a year and since the number of the aged over 84 rose by about 67 percent between 1965 and 1978, part of the increase is due to aging within the aged population.

Table I
Per Capita Personal Health Expenditures, Persons 65 and Over, 1966-1978

Fiscal year	Total expenditures	Direct expenditures	Out-of-pocket expenditures		Out-of-pocket as a percent of income	
			Money[a]	Real (1967=100)	Money	Real (1967=100)
1966	$ 445	$237	$300[b]	$319	13.9%	14.4%
1967	535	198	294	294	12.6	12.6
1968	647	178	278	261	11.0	10.7
1969	735	206	315	278	11.7	11.2
1970	828	270	380	315	13.3	12.6
1971	926	317	443	344	14.1	13.2
1972	1,034	367	496	367	14.4	13.3
1973[c]	1,081	357	490	352	12.9	12.1
1974[c,d]	1,181	392	531	361	12.8	12.3
1975[c]	1,391	380	524	317	11.5	11.0
1976[c]	1,547	418	563	309	11.4	10.5
1977[e]	1,745	463	613	307	11.4	10.2
1978[e,f]	2,026	NA	NA	NA	NA	NA

[a] Direct expenditures plus estimates of premiums for private and Medicare Part B insurance.

[b] No amount for Medicare Part B premium.

[c] Revised estimates.

[d] First year of revised methodology. Income data not strictly comparable with other years.

[e] Preliminary estimates.

[f] Calendar year.

Source: Charles R. Fisher, Table 8; Robert M. Gibson and Robert R. Fisher, Tables 1 and 7, and p. 15; Marjorie Smith Mueller and Robert M. Gibson, Table 7. Per capita income figures calculated from U.S. Bureau of the Census.

Additional direct spending for physician care (from $33 in 1970 to $78 in 1977) partly reflects higher Medicare coinsurance provisions, inflation, and growth in the number of physicians who do not accept Medicare payment as full payment for services rendered. Another part mirrors increased utilization of covered and noncovered Medicare services. Increased utilization also helps to explain why spending for all other services rose from $223 in 1970 to $348 in 1977. Roughly 40 percent of the latter amount was spent for prescriptions and dental care. About $188 of the remainder was spent for nursing home care, meaning that this service far outdistanced other health services in terms of out-of-pocket importance to the typical elderly person. The typicality of nursing home care is discussed more fully below.

FINANCIAL BURDEN

Researchers have employed at least two competing approaches to measure the burden of health expenditures. The first ("absolute burden") assumes that a household's burden varies positively and only with its absolute level of out-of-pocket spending; this measure may or may not express expenditures over time in constant dollars. A variant of this approach implies that a burden exists if aged persons spend more out-of-pocket than do other persons.[3]

The second approach ("relative burden") is grounded in the notion that the burden cannot be measured independently of ability to pay. It contends that the burden varies positively with the proportion of income spent for health care. How, proponents ask, can anyone maintain, all things given, that a person who spends $600 for health care bears a larger burden than someone spending $300, if the former person's income is $15,000 and the latter's is $4,000?

Column 4 of Table I shows that the average absolute money burden (per capita expenditures unadjusted for inflation) borne by the aged dipped from $300 to $278 during the first two years of the Medicare and Medicaid programs. Thereafter, this burden increased almost uninterruptedly through 1977. In real terms--expenditures adjusted for inflation in the medical care component of the consumer price index--the absolute burden followed a similar pattern.[4] Column 5 of Table I shows that real per capita spending declined until 1968. Real spending subsequently increased until 1972. It then began to decline, and in 1977 real spending was less than it was in 1966.

The relative burden unadjusted for inflation (Column 6 of Table I) dropped sharply between 1966 and 1968, as the decrease in spending was accompanied by a rise in average income.[5] This burden increased in 1969; by 1971 and 1972 it exceeded its level in 1966. Subsequently, it tended to decline annually, as average income rose faster than spending. In 1977, the aged spent 11.4 percent of their income for health care, as compared with 13.9 percent in 1966. Thus, in money terms the relative burden declined even though the absolute burden increased perceptibly.

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[3] Persons 65 and over can be expected to spend more for health care than other persons because of the infirmities of old age. However, the aged are unlikely to have larger outlays for child care, formal education, work-related expenses, and other items typical of a different stage of the life cycle. Comparisons of health expenditures alone by age, therefore, can yield misleading conclusions.

[4] The medical care component may be an unreliable measure of inflation in out-of-pocket expenses if its composition differs from the relative importance of the items in the market basket. If inflation is overstated, real outlays and burden are understated. Also, rates of inflation may vary considerably within age groups (Michael 1979).

Column 7 of Table I shows that the rate of decrease in real relative burden markedly exceeded the rate for money relative burden, 29.2 percent versus 18.0 percent. Of course, as was the case with column 5, this conclusion depends upon whether the change in a national price index resembles the inflation rate experienced by the elderly. Available evidence reveals, contrary to widely held opinions, that the national index does approximate price increases to the elderly (Torda 1972; Borzilleri 1978; Bridges and Packard 1981). Between 1967 and 1979, for example, a specially-constructed price index for the aged rose 120 percent versus 117 to 118 percent for other consumer groups (Bridges and Packard 1981).

An "average" burden may hide important differences between income classes, and may also be unrepresentative of the burden on different persons within the same income class. Because of data constraints, these matters could only be investigated on a limited basis. Table II indicates that in 1972-1973 absolute per capita burden for noninstitutionalized persons tended to increase with family (including unrelated individuals) income. This finding arises because Medicaid pays most of the health bills of eligible poor persons and because the wealthier elderly can afford elective services. The table also shows that the relative burden fell precipitously as income increased, from 12.7 percent for families under $3,000 to 2.1 percent for families with at least $25,000.[6] In all likelihood, a similar pattern prevailed in 1977, although at a lower level of relative burden. In other words, while relative burden fell between 1966 and 1977, many low-income aged persons spent a large portion of their income for health care in 1977.

The preceding analysis does not distinguish between expenditures for all aged persons combined and expenditures for those aged persons with expenses. Yet the distinction can be extremely important if a relatively large number of people do not receive care. To wit, if one-fifth of the aged had an expense of $150 for a service, the overall per capita average would be only $30. On the other hand, if 90 percent incurred a $150 expense, the two averages would be almost identical ($30 versus $33.33).

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[5] Relative burden would have been higher if it was based on median income rather than mean income because the median was lower than the mean. However, the decline in burden would have been slightly greater because median income increased faster than mean income during the study period.

[6] Percentages are based on income before taxes. The proportions would have been approximately the same for income after taxes up to $10,000. The after-tax burden for families with gross income of at least $25,000 was 2.7 percent.

Table II

Selected Spending Patterns and Wealth of Families with an Aged Head, by Income, 1972-1973

Selected Items	All income levels[a]	Under $3,000	$3,000 to $4,999	$5,000 to $5,999	$6,000 to $7,999	$8,000 to $9,999	$10,000 to $14,999	$15,000 to $24,999	$25,000 and over
Number of families (thousands)	14,250	4,591	3,211	1,075	1,536	920	1,192	766	313
Average annual expenses for:									
Recreation	$ 336	$ 80	$ 194	$ 320	$ 324	$ 470	$ 646	$ 1,082	$ 2,005
Gifts and contributions	490	130	272	354	491	634	635	1,351	5,667
Health care, Excluding employer share of insurance	449	254	412	465	499	681	688	759	871
Out-of-pocket	252	146	234	256	258	419	375	395	532
Percent of income spent for health	7.1%	12.7%	10.5%	8.5%	7.3%	7.6%	5.7%	4.1%	2.1%
Average market value of financial assets	$13,511	$1,867	$6,670	$11,406	$14,350	$22,165	$28,695	$45,608	$114,191
Percent homeowners	66%	52%	66%	71%	75%	82%	77%	83%	84%

[a] Includes families with incomplete reporting. The average expenditure for those families making purchases is calculated by dividing the amount for all families by the percent reporting making purchases.

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Interview Survey, 1972-73, "Annual Expenditures and Sources of Income Cross-Classified by Family Characteristics, 1972-73 Combined" (Springfield, Virginia: National Technical Information Service, 1978), Table 17.

Table III shows that in 1977 per capita spending for all noninstitutionalized aged persons combined differed noticeably from the average for only those persons with expenses for each listed service, except physician care and prescriptions. However, for the majority of listed services, average out-of-pocket expenses for persons with a known expense was comparatively small--between $63 and $76--and only a relatively small number of people directly spent more than $250 for a particular service. In the case of hospital care, the average out-of-pocket outlay for persons with an expense ($194) was largely due to Medicare cost-sharing requirements. The out-of-pocket average for dental services was "only" $115; however, it exceeded $500 for 8.3 percent of the aged.

Absent from Table III--but critically important to any discussion of burden--is nursing home care, the fastest growing high-dollar volume service since 1966. As was noted above, per capita direct spending for this service consumed about $188 of the $613 of the aged's out-of-pocket expenses in 1977. However, only a small fraction of the elderly actually received this service. Indeed, on any given day during the last eight months of 1977, less than 5 percent of the elderly resided in a nursing home. After recognizing patient turnover, average direct spending by the noninstitutionalized elderly was about $447, or 73 percent of the overall figure of $613. On the other hand, the out-of-pocket outlay for many persons who paid their own nursing home bill was very large. In 1977, the average monthly charge in skilled nursing facilities was $902; in intermediate care facilities, $586 (U.S. DHEW 1979, Table 39).

Finally, the spending patterns in Table II suggest that the vast majority of the elderly received at least essential services in 1972-1973.[7] They also suggest that at the margin, additional health services may be less important to many aged's well-being than other goods and services. These conclusions emanate from the fact that families with an annual income of at least $6,000 in 1972-1973 spent more (or almost as much) on average for recreation and/or gave more money away than they spent for health services. If additional health care services had been necessary, more could have been spent for health care by reallocating money from recreation and gifts to health care. Similar reasoning suggests that during inflationary times the aged could maintain their level of health spending by realigning their expenditure patterns. Any decrease in real spending could, therefore, indicate that the aged do not perceive the benefits of an additional service as justifying the additional costs.

DISCUSSION

Over the last two decades, society has demonstrated a strong preference to shift resources to elderly persons, particularly in the case of health services. In 1979, 48 major federal programs directly benefited the elderly (U.S. Congress 1980, p. 4). About $1,500 per person in the labor force is currently transferred to the aged by the federal government. This relatively high level of redistribution stems partly from the aged being perceived as poor and unable to help themselves, and partly from a desire to provide financial assistance by dint of age alone. Said differently, taxpayers have elected to shift resources to the elderly because they received more enjoyment from spending dollars on the aged than spending those dollars on themselves. And, of course, taxpayer willingness to assist the elderly has been reinforced by the voting power of the elderly.[8] Indeed, the democratic process itself may have occasioned an overexpansion of social programs for the elderly (Browning 1975).

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[7] The percentage distribution of expenditures by income class and type of expenditure is available from the author upon request.

Society now seems resistant to additional transfers and is even encountering problems in maintaining them at current levels. Attempts by the Reagan administration to reduce Social Security income and Medicare benefits--politically unthinkable maneuvers just a few years ago--reflect the changing perspective. One major manifestation of the new attitude is widening taxpayer opposition to additional levies in order to finance the Medicare program. In short, a political limit seems to have been reached in which an increasing proportion of the electorate wants to spend more dollars for their own needs rather than for those of the elderly.

One possible explanation for this attitude may be the realization that a large and growing number of elderly persons are not only not poor, but are also economically better-off than many of the persons who pay their health bills.[9] In 1979, for example, almost one-third of the 8.8 million families with an aged head had an annual income that exceeded $15,000, or approximately triple the official poverty benchmark for this subgroup of the population. At the same time, about 10 percent of the nonaged were poor. Furthermore, 13.6 percent of all aged families received an annual income of at least $25,000, which was greater than the amount received by 62 percent of nonaged families.

The size distribution of income among the elderly clearly challenges any stereotyping of today's aged as poor, and raises questions about whether age alone should continue to be the primary determinant of Medicare eligibility. Is it, for example, equitable to require low-income young families to subsidize health care received by higher-income aged families? Also, can age alone continue to be a politically acceptable criterion when competition for public dollars is increasing? The answers to such questions may be affirmative, but the probability of positive responses is likely to decline if the conventional definition of economic well-being (amount of money income) is broadened to include assets and the implicit income often associated with home ownership (Moon 1977).[10] Table II shows that the proportion of elderly households that owned a home (i.e., with no or relatively small mortgages) in 1972-1973 ranged from 52 percent for the lowest income group to 84 percent for the highest group. In addition, families with an annual income of at least $15,000 averaged more than $45,000 in financial assets (savings, checking, and brokerage accounts; stocks; bonds; and mutual funds), including $114,191 for families with at least $25,000.

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[8] Of course, many elderly persons also pay taxes, but the amount paid is usually significantly less than that paid by the working population.

[9] As an aside, it is important to recognize that the elderly's income is generally not fixed--particularly the income of the poorer aged--because since 1975 Social Security benefits have been automatically adjusted (with a time lag) for inflation.

Critical decisions about appropriate health strategies will be necessary relatively soon because of projected increases in the aged population. According to official estimates, the number of aged people will rise 25 percent between 1977 and 1990 (including a 31 percent increase for persons 85 years and over), as compared with 6 to 16 percent for nonaged persons. These growth rates, prevailing legal arrangements, and the perpetuation of historical trends help to explain why nationwide personal health expenditures are predicted to rise from $189 billion in 1979 to $731 billion in 1990, or from 8 to 9.6 percent of gross national product (Freeland and Schendler 1981). They also explain why the Medicare hospital trust fund is expected to go from a position of no imminent danger to total depletion by the early 1990s (Board of Trustees 1981).

Since the number of aged persons is expected to grow faster than the nonaged, each worker will "care for" an increasing number of elderly people. In fact, the number of aged persons per 100 people in the age bracket 18 through 64 years is expected to increase from 18.4 in 1980 to 20 in 1990 and to 26 in 2020 (Soldo 1980).[11] Additional dependency means that workers will find it more difficult to subsidize health care and upgrade the elderly's standard of living without adversely affecting their own standard. Given insufficient growth, an intergenerational clash may occur as the young inherit the legacy of past public policies. As Somers (1980, p. 16) has observed:

> But, unless we develop more effective and efficient ways of providing the elderly with health care, the impact on their lives, on the economy, and on our basic values could be far greater than the current energy crunch. If these trends and problems are ignored, we inevitably will reach a point of having to choose between the interest of the elderly and those of [the rest of] society. If that point is reached, history makes clear what the answer will be.

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[10] Money income also understates the gross income of elderly persons who receive food stamps, housing subsidies, fuel subsidies, and other forms of in-kind income (Paglin 1980). The Congressional Budget Office (1977, p. 31) estimates that in 1976 in-kind transfers reduced the proportion of poor households with an aged head (after cash transfers but before taxes) from 16.7 percent of the total to 6.1 percent. The latter figure rose to 14 percent after Medicare and Medicaid were excluded from the analysis. One reason for excluding these programs is to avoid the implication that a poor person can cease being poor by becoming ill.

[11] The number of Social Security beneficiaries is expected to rise from 31 per 100 workers in 1980 to between 40 and 70 by 2050. The aggregate burden of dependency may be less than these numbers suggest if lower birth rates translate into relatively less public spending for younger persons.

Expected growth of the aged population and health expenditures, and the likely improvement in the financial position of the elderly (due to their lifetime real earnings being higher than those of today's elderly), suggest that a moratorium be placed on major improvements in mandated standards of care unless the resultant social benefits clearly justify the social costs. In terms of Medicaid nursing-home standards, such a policy would necessitate the resolution of potential tradeoffs between the accessibility of quality care and efforts to eradicate poverty. Specifically, policy makers must decide "whether the *poor who are sick* should be made better off compared with the *sick who are not poor*, or whether they should be made better off compared with the *poor who are not sick*" (Schelling 1979, p. 226).

Existing standards of care should be reviewed regularly to ascertain their continued cost-effectiveness, something which has not been widely done at the federal level (Reiss 1981). Also, society might reap significantly larger net marginal benefits by containing spending for older persons while increasing it for other age groups. Indeed, a DHEW Health Resources Administration task force (1977, p. 16) has observed:

> This question is one that society must face squarely as the over-75 age population continues to grow, and as the challenge of providing basic support to this age group looms overwhelmingly. Is it of any value to the 80-year old widow to be the target of an active rehabilitation program? Or would it be better for her piece of mind and society's pocketbook to direct such activities elsewhere?

Projected growth also suggests that government not broaden Medicare coverage for services for which demand may be staggering, such as community-based forms of long term care (Grimaldi and Sullivan 1981) and outpatient prescriptions.[12] In the latter case, Table IV shows that only a relatively small number of aged people need protection against large drug bills. Indeed, about 77 percent of the aged families spent less than $100 for prescriptions in 1973; another 12.4 percent spent between $100 and $200. However, two percent of aged families spent at least $400 for medications, which almost certainly strained the 37,000 families (0.009 x 4,152,700) with income below $3,000, but was less disturbing for the 32,000 families (0.027 x 1,176,200) with income of at least $15,000.[13]

The resultant fiscal pressures of escalating Medicare expenditures could be addressed by increases in Social Security taxes or transfers of general tax revenues to the Medicare program. Another possibility is to increase deductibles and coinsurance requirements, perhaps by at least the same rate as the automatic inflation adjustment to Social Security benefits.[14] A third option is to change Medicare from an entitlement program based on age only to one that is also conditioned on a person's income and resources. To be sure, this alternative would be opposed by many elderly persons and interest groups, some because of a perceived stigma attached to means tests and others because of disenfranchisement. Nevertheless, this option may someday become necessary in order to preclude fiscal constraints from jeopardizing the ability of the needy aged to acquire essential services. Furthermore, this option may be preferable to a fourth alternative--to ration a prospectively-determined bundle of services according to official definitions of needs and priorities.

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[12] One recent example of the potential expensiveness of drug coverage is the state-financed New Jersey Pharmaceutical Assistance for the Aged (PAA) program. PAA covers aged unrelated individuals with annual income below $9,000 and aged couples with less than $12,000. The program was estimated to cost $6 million for 60,000 persons. During its first year (1978), about 250,000 persons enrolled at a cost of $37 million. The additional funds were partly obtained from reductions in mental health services and, after over one-quarter of the enrollees were found to have financial assets exceeding $25,000, by raising the copayment per prescription from one to two dollars.

[13] The percentage distribution of expenditures by type of living arrangement (unrelated individuals, couples) is available from the author on request.

A fifth possibility is to retain the present program but at a higher age requirement. The plausibility of this approach seems to have been recognized by the House Committee on Aging (U.S. Congress 1980, p.4) in terms of long term care:

> It is our contention that if this country attempts to serve all seniors equally through its fragile Aging Network, it will actually be able to serve only a few, and not very well at that. Our policy must realize that those in need--the 75+ population--have first rights and must be the focus of future aging policy.

Of course, major changes should be made gradually so that the elderly and near-elderly have sufficient time to modify their behavior and expectations accordingly.

A sixth possibility--and one that has more important implications for Medicaid than Medicare--is to provide families with financial incentives to care for their chronically ill relatives at home rather than placing them in a nursing home. Also, rules that enable individuals to divest themselves of assets and qualify for Medicaid could be tightened to contain Medicaid costs.

Finally, it should be noted that projected increases in health expenditures may not occur if health care can be produced more efficiently. Some see additional regulations as the way to realize this goal. Others espouse fewer regulations and favor competitive models. Whatever the outcome of this debate, efforts to curb health costs will almost inescapably affect the elderly because they now consume approximately 35 percent of all days of hospital care, 90 percent of nursing-home days, 16 percent of physician office visits, and 25 percent of prescriptions. In all likelihood, costs due to excessive utilization, waste, and duplication can be eliminated without affecting services delivered. After a certain point is reached, however, cost-containment programs must necessarily affect quality or translate into fewer services.[15] Such programs are also likely to raise provocative questions about cost-benefit tradeoffs if rationing becomes necessary. Perhaps a harbinger of things to come is Medicare's recent suspension of its coverage of heart transplants because of their costliness.

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[14] Deductibles and copayments could be scaled by ability to pay, perhaps through a negative income tax. Otherwise, increased payments could intensify the unequal utilization of Medicare benefits (Ruther and Dobson 1981).

CONCLUSION

This paper has shown that absolute out-of-pocket expenditures per aged person increased during the 1970s, at the same time that the relative burden of these expenditures declined. Analyses of the income, wealth, and spending patterns of the elderly clearly show that many aged persons require financial assistance in order to purchase needed services. However, they also suggest that many of the aged have the wherewithal to pay more for health services. The aged's ability to pay and the likely continued mushrooming of health costs advise against the passage of new entitlement programs based on age only. Finally, these analyses support higher Medicare copayments and a means test for Medicare eligibility. Such changes may become fiscally unavoidable to ensure that low-income aged persons continue to have access to essential services.

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[15] Quality may decrease below former levels or may not increase as fast as otherwise because of the unavailability of sufficient reimbursement.

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An Economic Perspective on Hospices

*by Kim Carney**

INTRODUCTION

Although the number of patients enrolled in hospices is still small, the hospice movement has entered the American health care scene with the intensity of a religious revival and a growth rate characteristic of a "boom-town." The first American hospice, Connecticut Hospice, Inc., began operations in 1974. At the last meeting of the National Hospice Organization, 138 hospices had fulfilled the membership requirements of the organization and were full voting members (National Hospice Organization 1980); this number is, however, only a fraction of the number of hospices, either in existence or in the planning stages. The Joint Commission on Accreditation of Hospitals (JCAH) recently identified 800 hospices in some state of development (JCAH 1981).

Advocates point to quality and cost benefits achievable through hospices. The movement has been stimulated by the conviction that the care that dying persons have traditionally received in acute care hospitals is inappropriate; this belief developed almost simultaneously with another, reinforced by hospital utilization review, that acute care hospitals should serve only patients being actively treated for an illness. Advocates of hospices expect them to produce cost savings largely from the substitution of home care for hospital care.

The patient, along with his physician, chooses between hospice and traditional care. The choice of hospice care implies that curative care, appropriate in the early stages of the patient's disease, is no longer suitable. Continuation of curative care is expected to have no impact on the course of the disease and may, at the same time, have unpleasant side effects for the patient. Choice of hospice care implies the imminence of death. The decision to seek admission to a hospice is a difficult one, and both the patient and family are in need of supportive services.

Although the model for the hospice movement in this country has been St. Christopher's Hospice in Sydenham, England, which opened in 1967, there is considerable diversity among hospices here. Three types have emerged: (1) the free-standing hospice, such as St. Christopher's and Connecticut Hospice, Inc., which operates its own inpatient facility, (2) the hospital-affiliated hospice, and (3) the home care agency concentrating on providing hospice care predominantly in the home of the patient.

Because of the newness of hospices, relatively little is known about them; much of the existing literature is characterized by an

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Table III

Out-of-Pocket Expenditures of the Elderly, Selected Health Services, 1977

Expenditure	Inpatient hospital services	Ambulatory physician services	Dental services	Prescriptions	Glasses and contact lenses	Medical equipment and supplies[a]
Percent distribution	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
No expense, with a service	10.6	13.7	2.4	6.5	5.4	1.4
\$1 to \$49	2.5	29.7	8.0	28.3	4.3	8.6
\$50 to \$99		15.5		10.5	6.1	1.4
\$100 to \$249	2.7	12.6	6.5	9.5	1.7	1.7
\$250 to \$499	0.7	1.9	5.5	1.7		
\$500 or more	0.5	0.4	8.3			
Unknown	3.0	9.2	1.4	20.9	0.3	0.8
No service	80.1	17.1	68.0	22.6	82.2	86.0
Per capita amount						
All persons combined	\$ 509	\$ 102	\$ 39	\$ 58	\$ 13	\$ 13
Persons with expenses	2,557	123	123	75	73	95
Out-of-pocket expense	194	63	115	63	65	76

Note: Detail may not add due to rounding. Data are provisional. [a]Includes wheelchairs and crutches, corrective shoes, supportive devices, hearing aids and supplies, syringes, needles, etc.

Source: Judith A. Kasper and others, "Expenditures for Personal Health Services: Findings from the 1977 National Medical Care Expenditure Survey," National Health Care Expenditures Study, U.S. Department of Health and Human Services, National Center for Health Services Research, October 1980, selected tables.

Table IV

Percent Distribution of Out-of-Pocket Prescription Expenditures of Families with an Aged Head, by Income, 1973

Family income	Number of families (thousands)	All families	No expenditures	$.01 to $99.99	$100.00 to $199.99	$200.00 to $299.99	$300.00 to $399.99	$400.00 and over
All families	14,117.3	100.0%	30.0%	47.3%	12.4%	5.9%	2.3%	2.0%
Under $3,000	4,152.7	100.0	42.0	43.0	8.1	4.2	1.8	0.9
$3,000 to $4,999	2,840.0	100.0	29.6	44.9	13.6	6.5	3.1	2.3
$5,000 to $5,999	1,199.6	100.0	21.0	45.9	17.0	11.7	1.0	3.4
$6,000 to $7,999	1,715.7	100.0	23.2	54.7	13.9	4.4	2.6	1.2
$8,000 to $9,999	895.1	100.0	15.1	61.4	14.2	4.0	3.4	1.9
$10,000 to $14,999	1,333.0	100.0	26.7	46.2	15.6	7.5	2.5	1.5
$15,000 and over	1,176.2	100.0	24.3	48.1	14.0	9.6	1.3	2.7

Note: Detail may not add due to rounding.

Source: U.S. Bureau of the Census, Consumer Expenditure Interview Survey, 1972-73, Interview Survey Detailed Public Use Tape.

evangelical flavor. At the present time two activities are underway that will considerably increase our knowledge about hospices. First, the federal government, through the Health Care Financing Administration (HCFA 1980), is engaged in a demonstration project in which 26 hospices have been selected to receive reimbursement for certain hospice services provided to Medicare and Medicaid recipients in an attempt to understand the impact on the delivery of hospice care of a particular pattern of reimbursing hospices for services. Second, the Joint Commission on Accreditation of Hospitals has received grant monies to develop quality standards and a model accreditation program for hospices. Both of these projects will not only provide information about hospices but will also affect policy choices influencing the future of hospices. (In fact, the mere existence of the HCFA project seems to be influencing attitudes.) These policy choices may include an extension of third party financing and arrangements for accreditation--both of which will influence future hospice development.

Past experience indicates that increasing the available financing for a service is likely to increase demand and total expenditure for that service; a notable example of this can be seen in the rapid expansion of spending for kidney dialysis following Medicare coverage of this procedure (Science 1980). When financing arrangements cover some services and not others, they introduce a bias toward the covered services; in addition, they introduce a bias toward more specialization (Stevens 1971). The effect of the imposition of accreditation standards will have a lesser impact than expansion of third party financing, but it may reinforce the tendency toward specialization.

It is the goal of this study to examine some possible effects on hospices of the extension of third party coverage--both the sort of coverage involved in the HCFA demonstration and other arrangements--and the development of accreditation standards of certain types. The order of discussion will be: (1) the nature of hospice care, (2) financing arrangements, (3) the demand for hospice care including determinants and some possible effects of extending financing, (4) the production of hospice care including some possible effects of extending financing and developing accreditation standards, and (5) summary and conclusions.

THE NATURE OF HOSPICE CARE

As suggested by the three types of hospices developing in this country, hospice care is not characterized by a physical setting. It is, instead, characterized by a philosophy of care involving a number of elements. Foremost is the provision of palliative and supportive care to the dying patient in a dignified and caring fashion. Adequate pain control, treatment believed by many hospice advocates to be inadequately handled in the traditional care setting, is a central tenet of hospice care. Second, the hospice serves both the patient and family rather than focusing primarily on the patient. Not only is the patient enabled to remain with his family as long as possible, even dying at home in many cases, but supportive services are provided for family members during the patient's illness and for a period, usually a year, after his death. Third, hospice services are provided by an interdisciplinary team of physicians, psychiatrists, social workers, nurses, physical therapists, and others. Volunteers have played a significant role in the hospice movement; some volunteers are professional health care providers, and others are nonprofessionals who are often related to a patient who has died in a hospice. Since hospice work is emotionally demanding, the team approach includes support of staff members as well as of the patient and family.

Hospice critics suggest that hospice care represents an additional layer of services added on to the services in the traditional care setting and that the impact of hospice care will be to increase the total cost of care for the dying patient. It would appear that hospice patients receive certain services that other patients do not. It is not clear whether the cost of these services is offset by reduced hospitalization of the patient or possibly by a reduction in health expenditures for the patient's family. The HCFA study, which is looking at dying patients in both the hospice and traditional care setting, may provide new information about relative costs in the two settings.

It is difficult to pinpoint an individual hospice service that is not also available in the traditional care setting. Nevertheless, hospice advocates are convinced of the uniqueness of hospice care. A distinction often suggested is that the traditional care setting is so largely focused on curative care that it is unable or unwilling to provide suitable palliative and supportive care.

Some economic comparisons of hospice and traditional care illuminate differences between the two. Hospice care, whether inpatient or outpatient care, is considerably more labor and less capital intensive than care found in the traditional care setting. At the present time, hospice care involves considerably more philanthropic input than traditional care. The hospice, probably more than either private physicians or hospitals in the traditional care setting, perceives itself as defining and coordinating a wide range of services appropriate for the patient and family. In economic terminology the hospice defines the appropriate production function for care of the dying patient and his family. In this respect, the health care institution with the closest affinity to the hospice is the health maintenance organization (HMO); the HMO also defines the production function for the patient and coordinates a sizeable team of providers.

While both hospice care and traditional care include inpatient and outpatient care, it may be the case that the hospice case mix contains relatively more outpatient care than the traditional setting. However, there may be differences among hospices. It is not clear, at the present time, whether hospice care remains stable across the three different types of hospices. For example, is the ratio of inpatient to outpatient care the same for hospital-affiliated hospices as it is in home health agency hospices? It may also be the case that changes are occurring in the traditional care setting as well. It is possible that the pressures of utilization review and the success of the hospice movement are influencing patterns of care in the traditional care setting.

In the remainder of this study, the term hospice is assumed to mean a nonprofit institution that explicitly describes itself as a hospice and provides only hospice care. It is either a free-standing independent institution or, if affiliated with another institution such as a hospital or home care agency, operates autonomously. It provides a full range of hospice services and subscribes to the hospice philosophy set forth at the beginning of this section.

FINANCING HOSPICE CARE

Presently, hospice care is financed through patient payments, third party reimbursement, and philanthropy. Some hospices, functioning as demonstration projects, have received federal support. Since most hospices have attempted to serve patients regardless of their ability to pay, patient payments have not been a fully dependable source of income. Nonetheless, such payments are a necessary source of income. Third party arrangements, whether in the public or private sector, do not pay for hospice care per se. Rather, they pay for limited amounts of particular home services under specified conditions regardless of where the services are provided--in a hospice or in a traditional setting. Although there is some variation among third party arrangements, they generally pay for nursing, social work, and certain other home visits under defined conditions. However, because there is usually a specified limit to the number of covered visits, a substantial likelihood exists that hospice patients will exhaust these benefits prior to death. In addition, certain other visits during the patient's life are not covered, and bereavement services for the family following death are virtually never covered. Inpatient coverage is usually limited to hospitals and skilled nursing homes. Hospices may belong to neither category and, hence, be ineligible for reimbursement. It is surprising that hospices have grown as rapidly as they have in recent years in the absence of more substantial third party reimbursement.

Financial problems have been severe for many hospices, and their survival has depended to an important degree on philanthropy. Because hospice related philanthropy takes several forms, it is separated from other third parties in this discussion. Monetary contributions are an important element of these forms. In some cases, especially for the hospital related hospice, another institution--such as the hospital--provides office space, perhaps contributes to other overhead costs, and may even "lend" hospital staff members for specified time periods. Finally, most hospices are able to call upon volunteers for services. In some cases, volunteers are professional providers such as physicians and nurses; in others, volunteers are lay persons committed to the hospice philosophy.

Supporters of the hospice movement believe that future growth of hospices depends upon increased financial support, particularly through enlarged third party reimbursement. However, from past experience in the health services sector, it is apparent that increasing third party support is likely to change the volume and character of the services or of the institution providing the services. In order to understand the impact of increased third party support, it is useful to explore the types of support and their possible effects.

Public support for health services takes the form of either demand subsidy, such as the Medicaid program, or supply subsidy, such as the Neighborhood Health Centers. In a demand subsidy program, the consumer is subsidized in cash or with a voucher type arrangement that enables him to purchase goods or services in the open market. Under the voucher arrangement the goods and services will be paid for totally or in part by the government. In supply subsidy, governmental financing goes directly to the provider or providing institution, enabling the provision of free or low cost services to an eligible population. Historically, with respect to health services, supply subsidy programs have predominated; however, in the last twenty-five years demand subsidy programs (such as Medicare and Medicaid) have outpaced supply subsidy programs.

It is likely that any public support for hospices will be in the form of a demand subsidy. The HCFA experiment involves a demand subsidy. In this experiment various limitations on reimbursement are waived. If private insurance carriers begin to cover hospice services, this will function similarly to a demand subsidy, since out-of-pocket cost for covered services are reduced. Elements of an actual subsidy may also be involved if some employers pay for a portion of the insurance and if the tax liability of the family is reduced. At any rate, it is the impact of demand subsidy that will be considered here. (The implications of supply subsidy cannot be analyzed unless one knows the goals of the subsidizer who is able to "call the tune.")

Demand subsidy for health services takes one of two forms. The first, and most common in health services, is to provide reimbursement for specified services under specified conditions. This, of course, is the way that Medicare, Medicaid, and private insurance coverage are usually written. The second is some type of annual per capita coverage. (Persons enrolled in an HMO have this second kind of situation. The HMO, receiving a fixed amount per patient, functions as both an insurer and provider.)

Increasing third party coverage will inevitably affect the delivery of services. First, since the out-of-pocket payments by the consumer are reduced the quantity of services obtained is expected to increase, the amount of increase depending on the amount of price reduction and the consumer's price elasticity of demand. Second, the form of the coverage will affect the bundle of services obtained. When coverage is for specified services, the patient is provided an incentive to utilize covered services in contrast to noncovered services. If it may be assumed that the utilization of services--of kinds now defined as covered and noncovered--initially reflected economic efficiency, the impact of increased coverage is to bring about a movement away from economic efficiency. It is widely believed that private health insurance, with a tendency to cover expensive services in order to protect the consumer from large losses, has skewed utilization toward the more expensive services. In recent years, health insurance policies have broadened the range of covered services to include less expensive services. Coverage has, for example, been extended to include various medical tests done on an outpatient basis in order to avoid the higher costs of putting the patient in the hospital prior to the testing so that his insurance will pay for the tests. When coverage is on a per capita basis, there will also be an impact. While it is recognized that HMOs have an incentive to provide services efficiently, it is also believed that they have an incentive to provide minimal services. This is not perceived to be a serious problem so long as HMOs are functioning in a competitive market.

The concerns raised about the possible impacts of increased third party coverage--whether by government programs or private insurance policies--are twofold. These concerns apply to health care in general. First, the total quantity of services, and therefore total expenditures for these services, will increase as a result of the decline in out-of-pocket costs regardless of whether the coverage is on a per capita basis or for particular services. Second, the type of coverage, particularly when coverage is defined in terms of particular health services, will affect the mix of services that are utilized. I will explore these two issues with respect to increased third party coverage for hospice care. In order to understand the impact of coverage on utilization--in toto and by particular services--it is necessary to explore the determinants of demand for hospice care and the role of the hospice as a producer of services.

DEMAND FOR HOSPICE SERVICES

The demand for health services is understood to be a derived demand, derived from the family's demand for health (Grossman 1972). The family desires health as a consumption good--simply to enjoy good health--and as an investment good--to protect the family income stream. The family produces health, analogously to other commodities, by combining various inputs with time (Becker 1965): in the production of health, the inputs are both medical and nonmedical goods. The level of efficiency of the family in this production process has been shown to be influenced by the level of education, particularly of the wife and mother (Grossman 1972). In this context, demand for the various services is seen to be influenced by income, price of services, education, the costs of possible alternative goods, time costs, and taste.

Determinants of Demand for Hospice Care

In relating this model specifically to the demand for hospice care it is apparent that from the patient's point of view the demand for hospice care, in contrast to the demand for care in the traditional setting, is a demand for services solely as a consumption good. The acceptance that death is imminent, a condition required for admission to most hospices, implies that services are no longer sought in order to protect the individual's income stream. An implication of this recognition is that it is likely that the higher the income stream the longer the family will desire curative services to protect the income stream and the longer the acceptance of the imminence of death will be delayed. All other things being equal, one would expect that high income patients would be admitted to a hospice at a more advanced stage of their disease than lower income patients. Or, high income patients may be less likely to seek admission to a hospice than others.

Members of the patient's family may, however, prefer hospice to traditional care because they believe they are protecting their own health, and thereby their collective income stream. It is known that following a debilitating illness or death of a family member other family members are at a higher risk of morbidity and mortality than like persons not experiencing a death in the family. It is believed by hospice advocates that hospice care can reduce this risk to family members through services to them during the illness and after the patient's death. Thus, while demand for hospice care by the patient reflects a demand for a pure consumption good, this situation does not necessarily hold for the entire family.

Time costs are high when hospice care is sought; a care provider must be available in the home 24 hours a day. If the care provider, who is usually a member of the family must leave the labor force in order to be with the patient, the opportunity cost to the patient and family is high. If alternative care is available at a lower time cost, it is likely that the higher the earnings of the potential care provider, the less likely is the family to seek hospice care.

Education is relevant for hospice demand on two counts. First, if managing the care of a hospice patient is more demanding of the family than managing the care of a patient in the traditional setting, a well educated family is more likely to be able to handle the situation efficiently than a less educated family. Second, it may be that the concept of hospice care is more acceptable to a well educated family than to others. Income and education are frequently related; however, their relationship to hospice demand is not symmetrical. It is expected that hospice demand rises with education and falls with income.

There are few goods and services whose demand is not affected by their price, particularly their price relative to the price of alternative goods. Thus, not only the price of hospice care is important but also the price relative to the price in the traditional care setting. In considering the relationship of price to demand it is the out-of-pocket price to the patient and family that is relevant. Extending financing for hospice care will predominantly affect the price variable.

Individual preferences are a matter of great importance in the demand for hospice care. To some, the concept of hospice care is very attractive; the high level of philanthropic contributions attests to this. To others the concept is abhorrent. The recognition of the impending death and open discussion of it, the thought of a family member dying at home, or the possibility of living with a group of dying patients may affect an individual so negatively that he can not consider the possibility of hospice care. However, in recent years death has been treated more openly in American society than previously (Halper 1979).

In order to consider the impact of changes in third party coverage on hospice demand it is necessary to hold other variables constant. While this is easy to manage conceptually, the real world is more dynamic. For example, it is unlikely that demand for hospice care has reached a point of long-run equilibrium. Demand for a new product may well increase in a manner approximating a learning curve as consumers become familiar with the new product. If this is the case, demand would increase at the outset in an increasing rate which then turns into a decreasing rate until some potential level of demand is finally reached. If this is a true assessment of the hospice situation, demand will continue to grow for some time whether third party coverage is extended or not.

Impact of Extending Third Party Coverage

The major impact of extending third party coverage will be to reduce the out-of-pocket costs of hospice care to patients and their families, thereby affecting the price, an important determinant of demand. (The following discussion assumes that other determinants of demand remain constant). The extent of the impact on demand will depend on the magnitude of the price decrease and on the elasticity of demand, i.e., the responsiveness of demand to changes in price. If the third party coverage merely replaces existing philanthropy so that there is no change in the out-of-pocket cost to the patient, there will be no increase in the quantity demanded.

This discussion can be illuminated using typical supply and demand graphs (See Figure 1). The demand curve (dd) reflects the negative relationship between price and quantity demanded; a positive relationship between price and quantity supplied is indicated by the supply curve (ss). Demand and supply together determine the market price (p_o) and quantity (q_o). With the extension of third party coverage the supply curve shifts to $s_c s_c$ and a new equilibrium is established. The price implicit in both supply functions reflects both the cost of production and any subsidy, either from philanthropy or other third parties. As a result of third party coverage the quantity demanded has increased from q_o to q_c. The vertical distance between ss and $s_c s_c$ indicates the extent of the change in the cost to the patient and family before and after third party benefits are extended. If demand is inelastic, for any given percentage decline in the out-of-pocket cost of hospice care the quantity utilized will increase by a smaller percentage. If demand is elastic, any given percentage decrease in price will be accompanied by a larger percentage increase in quantity.

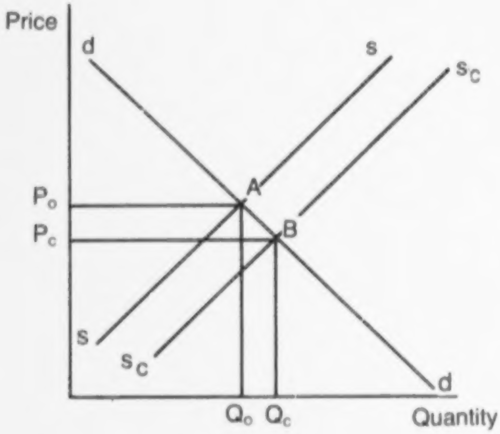

Figure 1

It is difficult to estimate hospice demand and its elasticity at the present time because of lack of data and because the demand curve for hospice care is continually shifting to the right as the hospice idea is understood by a larger share of the population. There are doubtless two groups in the population--one with a high elasticity of demand and one with a low elasticity of demand. (While there surely is some group in the center, vocalized opinion appears to represent the two extremes.) In the low elasticity group belong persons who will not respond readily to price changes, i.e., those to whom the hospice concept is abhorrent as well as those who are committed to the concept even when it is more costly than care in the traditional setting. In the high elasticity group belong families presently caring for an ailing or dying family member at home. In such cases, if third party coverage becomes available, families are likely to pressure physicians to admit such patients to hospices. Although most hospices limit admission to persons with a brief life expectancy, say within six months of death, physicians and hospices may be encouraged to admit patients that are almost but not quite eligible under current standards. Cohen (1979) has claimed that physicians are presently "hiding" dying patients in acute care hospitals in order for them to collect third party payments. A parallel situation might be the "hiding" of patients with a longer life expectancy than appropriate in a hospice. Although the aggregate elasticity is unknown, it is likely high judging from demand for other health services.

The discussion to this point has focused upon hospice services in general; it would be applicable for either of two types of financial arrangements for hospice care--coverage for hospice services or per capita coverage. However, hospice services are actually a bundle of services such as those provided by nurses, physicians, social workers, volunteers, and others. If third party coverage is extended on a service basis, as in the HCFA experiment, it is likely that there will be reimbursement for some but not all of the services provided by a hospice. In this situation utilization of covered services is expected to increase and the overall mix of provided services is likely to change.

If there is a degree of substitutability between two services--such as those provided by RNs and LPNs--and the price of one service declines, utilization of the good whose price has fallen will increase. Utilization of the substitute good with the constant price may increase, decrease, or remain the same. However, the ratio of the utilization of the good whose price has fallen to the good whose price has remained the same is expected to increase. If presently the patient is charged for visits by both professional staff and volunteers, and if third party coverage reduces out-of-pocket cost for visits by professional staff while the cost for volunteer visits remains unchanged, the patient will increase the ratio of professional to volunteer visits. Of course, if the hospice rigidly defines the appropriate number of visits by type, patient demand would have little effect. However, patient preference is likely to be a major factor influencing the bundle of services provided; this has been the experience in the traditional care setting when new services have become eligible for third party coverage.

Extension of coverage might conceivably have a nonprice effect on demand. The addition of hospice care to insurance policies might increase the visibility of such care or, alternatively, might provide hospices with more of an aura of respectability. Coverage, in effect, changes taste; the impact of this would be a shift in the demand curve to the right. The result of this change in taste reinforces the price effect. The quantity of hospice services demanded becomes still larger.

It is possible that the adoption of accreditation or licensure standards for hospices might also reassure potential patients about the acceptability of hospice care. If this were the case, demand would shift out, as above, but there would, of course, be no concomitant shift in supply. However, the demand effects resulting from increased acceptability or visibility brought about by either extended third party coverage or accreditation are expected to be small relative to the price effects.

Hospices, for the most part, limit admission to cancer patients and, as previously discussed, to patients in the final months of life. A change in either of these policies could have a sizeable impact on demand for hospice services. While such changes are not part of the HCFA experiment, it would not be surprising for there to be pressure to change either or both of these policies subsequent to extending third party coverage to hospice care.

THE HOSPICE AS PRODUCER

Even though the HCFA experiment and potential extension of the third party coverage for hospice care has been described as a demand subsidy, this method of subsidy will affect the supplier. Typically, the hospice provides services in advance of payment, subsequently bills the appropriate third party, and still later--often some months later--bills the patient for any amount not covered by the third party payor. Costs of collection from third parties are generally lower than the costs of collection from patients and families. Thus, the hospice will be inclined to modify the mix of services it provides in order to reduce costs.

This situation can be seen by looking at the hospice's production function, which expresses output as a function of inputs. In economic usage, output is frequently expressed as a function of capital and labor input. However, it is helpful in this case to express output, i.e. hospice services, as a function of inputs such as nursing services, physician services, and other inputs. Such a function may be expressed as:

$$HS = f(RNS, MDS, SWS, VS, \ldots, EQ),$$

where HS is hospice services; RNS is nursing services; SWS is social work services, VS is volunteer services; and EQ is equipment. Additional inputs might well be included. It is assumed that in the short-run the function exhibits the usual economic characteristic of diminishing marginal returns.

If the hospice is a nonprofit organization, it seems reasonable to assume that its administrators wish to maximize the quantity of services provided given their budget. In this case they will wish to combine inputs in an economically efficient manner in order to maximize output (See Figure 2). (Although there is a growing literature on the complexity of behavior of nonprofit firms, particularly of large institutions, it seems appropriate based on the literature and on discussion with hospice personnel to adopt a service maximization model.) The isoquant I_o represents all the possible combinations of nursing care and volunteer services that can be employed in producing a fixed level of hospice care. In this discussion

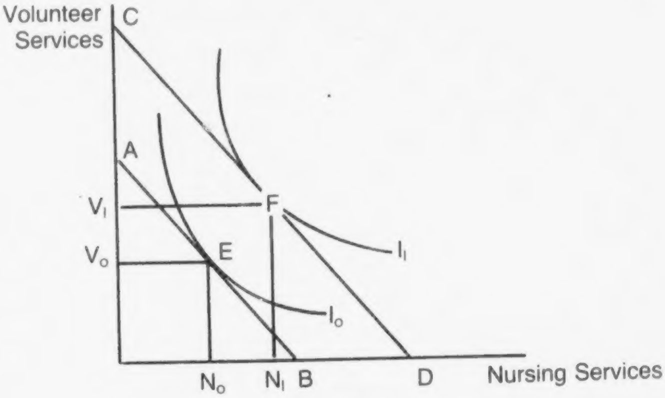

Figure 2

it is assumed that other possible inputs are held constant. The budget or isocost line (AB) indicates all possible combinations of these two inputs that can be obtained for a given budgeted amount. It is appropriate to talk of the cost of volunteers because, even though they receive no salary, there are costs associated with their recruitment, training, and scheduling. In terms of the budget, if only volunteers are used, the quantity obtainable is shown by A; for nurses the equivalent quantity is B. The least cost combination of nurses and volunteers (for budget line AB) is shown at point E when N_o nurses and V_o volunteers are employed.

As isoquants and expenditure lines move to the right (I_1 and CD), they reflect, respectively, a higher level of output and expenditure. Since the slope of the expenditure or isocost line reflects the price ratio of the two inputs involved, these lines will remain parallel so long as prices remain constant. The curved portion of the isoquant indicates flexibility in combining inputs. However, once the curve becomes parallel to either axis, the portions of the isoquant beyond that point are irrelevant.

Reimbursement on a per capita or per diem basis would have a neutral effect on the mix of services provided. Increased reimbursement would result in a shift out of the isoquant parallel to the original isoquant, as in Figure 2. The price ratio of the inputs examined are unchanged. However, reimbursement on a per capita basis might serve as an incentive toward late admission of a patient to the hospice in order to ensure that the per capita fee would cover the needed services. In contrast, reimbursement on a per diem basis would provide an incentive (i.e., change the hospice's objective function) for early admission so that the hospice could maximize revenue; this especially would be the case if, as seems likely, the cost of hospice care increases during the course of the patient's illness. Either per capita or per diem reimbursement is based on an average cost for providing adequate care. If the amount is inadequate, hospices may turn to philanthropy to supplement reimbursement. However, reimbursement provides a built-in ceiling on spending but avoids an elaborate web of regulation defining adequate care.

When third party coverage is extended to particular hospice services, the cost of producing covered services is reduced through the reduced cost of collecting for those services. Graphically, when the cost of one input changes while another remains constant, the slope of the isocost line changes (See Figure 3). The original isocost line is AB. Given isoquant I_o, the initial outcome is that V_o and N_o are the respective amounts of volunteer and nursing services that are used in producing hospice services. Once nursing services become eligible for third party coverage, the isocost line shifts to AC and the relevant isoquant to I_1, becoming with the new amount of nursing and volunteer services N_1 and V_1, respectively. The outcome is similar to and reinforces the impact of extending third party coverage on the demand for hospice services. The ratio of covered to noncovered services, in this illustration of nursing to volunteer services, has increased.

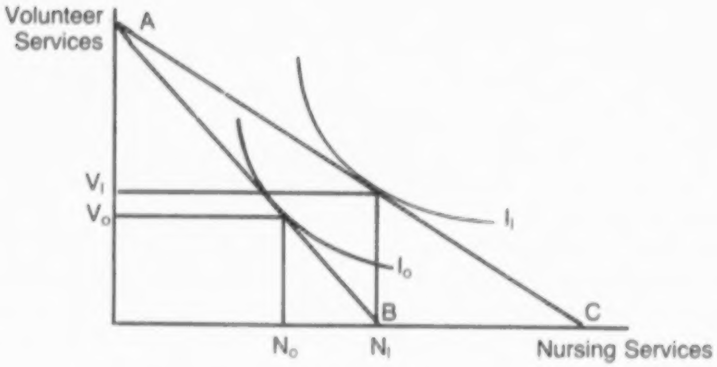

Figure 3

It seems likely that, in order to control total spending, reimbursement by services will require detailed regulations. Consider, for example, the situation where, as a patient's condition deteriorates, the cost of home care increases to the point where it is significantly higher than inpatient care. Under a lump sum type of reimbursement, either per capita or per diem, the decision to move the patient is left to the hospice and the patient. Under service reimbursement the necessary regulations might present varying problems. On the one hand, they might be written so that the hospice has little incentive to provide the most economical care that is appropriate. Alternatively, regulations written with only economy in mind may prove excessively restrictive.

Impact of Certain Types of Accreditation

In most industries the shape of the isoquant is determined by technological factors and, given the technology, production is influenced by economic factors. If the industry is competitive, quality is maintained as a result of the forces of competition. Even when the industry is not competitive, quality is usually definable in terms of the end product which may be required to conform to certain standards. Under these circumstances, the producer is free to adopt the most efficient method of production; in fact, market forces provide incentives to be efficient.

In the health sector, however, standards have typically not been imposed on the end product but have been imposed on the production process. Such standards affect the production function or the shape of the isoquant. Standards are embodied in the existing isoquant, and new ones will change the shape of the isoquant. Standards take a myriad of forms, but three examples will illustrate the possibilities: (1) particular tasks, presently carried out by persons with varied qualifications, are mandatorily assigned to persons with particular qualifications; (2) a fixed ratio of staff of particular qualifications is required; (3) a minimum quantity of a particular service is required for each patient.

If a particular task has been carried out by either a social worker or a nurse, the mandatory requirement that the tasks be assigned to a social worker reduces the flexibility of the hospice. In terms of the isoquant the relevant curved portion is shortened or reduced. It is possible that as a result of this change the cost of producing the existing level of output has risen.

The imposition of a fixed staff ratio for certain purposes is very limiting. This situation might occur in a requirement that there be one RN for every three LPNs or that there be one home visit by a professional staff member for every visit by a volunteer. In terms of isoquants regulation of this form reduces the relevant portion of the isoquant to a point. Changes in relative costs will have no effect on the utilization of inputs. As a result, production costs will likely rise.

If a minimum quantity of a particular service is required, this might take the form of requiring one visit per week by an RN. In this case the effect is to truncate the isoquant on one side at the point represented by the required minimum, in this case one nursing visit, thereby resulting in a rise in production costs.

Accreditation standards or regulation of the types discussed may be more or less onerous. Normally, it will be the case that some hospices already meet these standards. Those that do not typically are required to increase spending in order to meet newly adopted standards. Standards are, of course, adopted in order to insure quality. Unfortunately, they have the side effects of reduced flexibility and increased costs.

SUMMARY AND CONCLUSIONS

Extension of third party coverage to hospice care is likely to have a significant impact on the delivery of hospice care. In the absence of any extension of reimbursement, hospice care is expected to increase in the next few years. With the extension of reimbursement, the rate of growth may accelerate. The kind of reimbursement introduced is as important as the level of reimbursement. Reimbursement for individual hospice services is likely to result in greater changes in the delivery of hospice care than reimbursement on a per capita or per diem basis. The role of covered services will appreciate relative to the role of noncovered services. Volunteer services, an important component of hospice care, are unlikely to be eligible for reimbursement; as a result, the relative role of these services is likely to decline. These changes will be predominantly influenced by the impact on demand but will be reinforced by the price impact on the production of hospice services.

The adoption of accreditation standards designed to insure quality is likely to reduce the flexibility of hospices and to exert upward pressure on the costs of hospice service. This impact, however, may be small.

Total expenditures for hospice care are likely to rise significantly if third party coverage is extended. However, this increase will occur because the quantity of hospice services will increase. (There has been no consideration here of the impact of growth on costs, that is, whether hospice production is characterized by increasing, decreasing, or constant costs.) The adoption of accreditation standards should reinforce the impact of third party coverage on increasing total expenditures for hospice services. It is not clear at the present time whether the increase in spending for hospices is fully offset by decreases in spending for services in the traditional setting.

Policy makers concerned with hospice care, whether in the public or private sector, are in a difficult position. On the one hand, it would make sense for hospices to have a longer period to mature prior to major changes in reimbursement arrangments or the imposition of accreditation standards. On the other hand, without additional reimbursement hospices are unlikely to achieve their growth potential. It is unfortunate that the current HCFA demonstration project does not permit the exploration of the impact of at least two different reimbursement patterns on the delivery of hospice care. The analogy between hospices and HMOs seems very clear. A reimbursement mechanism for hospices similar to HMO reimbursement should be tried and studied for its impact. Perhaps several demonstration projects, as well as additional studies, are in order before hospices are locked-in, either to reimbursement policy or accreditation standards.

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Regulation of Medical Technology: Problems and Proposals

*by Carol A. Szerszen**

INTRODUCTION

Technological innovation is usually perceived as a process by which more efficient combinations of labor and capital are used to produce a specified output. This has not been necessarily true in the health care sector and there is a growing concern that the utilization of medical technology is largely responsible for the rapid increase in medical expenditures over the past 15 years. A major problem facing today's health care sector is whether the rapid technological innovation and diffusion of the past years can continue to be supported by present day resources.

The uncertainty surrounding technology's role in increasing health care costs is reflected by the diverse results reported in empirical investigations of the issue (Baron 1974; Davis 1978; Feldstein and Taylor 1977; Mushkin *et al*. 1977; Russell 1975; Scitovsky and McCall 1975). The problems encountered in such investigations are largely due to difficulties in controlling for the various effects that technology has on different sectors of the health care system.[1] For instance, the "cost saving" implications of immunization against infectious diseases become questionable once it is realized that longer life spans are accompanied by increases in degenerative diseases, many which require extensive and costly medical care. New technology may often require additional labor and support service inputs, implying the need for technology-specific personnel and additional hospital space. A basic problem in attempting to control for input intensity is that such studies are limited to specific technologies, and do not allow us to make general statements about the impact of technological change.

Despite the tenuous link between rising health costs and technology, there has been increased federal involvement in the area. Federal regulation has largely been due to perceived failures of the medical marketplace (Rettig 1980). It is important to realize that the mere existence of technology is not the crucial problem. Rather, it is the *utilization* of technology under our third party reimbursement system which has led to inappropriate utilization. Since most consumers do not directly pay for medical services, there is little individual incentive to economize on the utilization of medical technologies. However, the overutilization of technological procedures and equipment is indirectly felt through rising health insurance rates, larger federal health expenditures, and high prices for goods and services. Technology utilization is further reinforced by the nature of physician education, patient expectations, and the malpractice insurance system. Physicians, particularly specialists, are trained to rely heavily on technology in patient care. Patients, on the other hand, have high expectations of the ability of the physician to alleviate or cure disease. If the physician does not use every available technique in treating the patient, not matter how small the benefits, he may become liable for malpractice.

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[1] The Office of Technology Assessment defines medical technology as all techniques, drugs, procedures, products, or systems containing those elements applicable to the practice of medical care (Office of Technology Assessment 1976b). Thus, technology can include the use of a simple antibiotic or the application of intensive care unit services to the post-operative patient.

The purpose of this article is to discuss the present framework of technology regulation and to propose alternative solutions to increasing regulation. More specifically, if technology utilization is responsible for rising health costs, direct regulation of technology introduction and diffusion may be a less appropriate corrective measure than efforts to correct the underlying causes and motivations for technology use.

FEDERAL REGULATION

The Food and Drug Administration (FDA) is the only federal agency with a mandate to control the introduction of technology. The FDA is responsible for insuring that new drugs and medical devices are safe and effective. However, even in the drug and device arena the FDA's powers are limited. Although medical devices have been defined to include most clinical and ancillary equipment, the legislation does not cover a novel combination of equipment and services already approved for use (National Academy of Sciences 1979a). Furthermore, the FDA's function is limited to the determination of "technical efficiency." Social and economic criteria for evaluating new drugs and devices are not required. Once a drug or device has been introduced into the medical marketplace, the burden of controlling diffusion and evaluating cost effectiveness falls on other federal and state agencies.

The 1938 Food, Drug and Cosmetic Act required drug manufacturers to submit proof of safety before a new drug could be marketed (Peltzman 1974). The 1960's thalidomide incident spurred Congress to pass a 1962 amendment which required firms to provide documented evidence of a drug's efficacy in addition to proof of safety. The law removed the 60-day time constraint on the FDA's disposition of a new drug application and empowered the agency to specify the testing procedure a manufacturer must follow to provide acceptable evaluative information.

Empirical studies of this amendment have indicated a marked decrease in the rate of innovation in the drug industry due to increased costs, risks, and time required to introduce a product (Grabowski 1976). Grabowski et al. (1976) found that post-1962 drugs were developed by fewer, larger (often multi-national) companies.

Peltzman (1974) estimated a $25-$350 million yearly net social loss from the amendments due to higher drug prices and missed benefits from slower introduction of effective drugs. However, there is also evidence that firms concentrating research and development funds in a few research areas were producing more new drugs than firms with more diversified efforts (Caglarcan, et al. 1976).

In the late 1960s, there was widespread belief that dangerous and ineffective medical devices were being diffused in the health care sector.[2] The 1976 Medical Devices Amendment was formulated with the specific purpose of avoiding many of the rigidities encountered in drug regulation. Three classes of devices were established: Class I devices must meet criteria on misbranding, adulteration and misregistration; Class II devices are subject to performance standards; Class III devices are subject to pre-market approval. Marketers of Class III devices must provide information demonstrating product safety and effectiveness (Brown 1978). The components and principle of operation must be detailed, the methods and control in manufacturing described, and relevant standards outlined.

Despite the greater flexibility, it is perceived that the amendment will have results similar to the 1962 drug law. Since the amendment is only five years old, evaluative research has just begun. However, some general observations can be made. Since almost 90 percent of all devices fall into Class II, the cost effectiveness of the regulation has been questioned (Helms 1980; Laufman 1977). The FDA's Bureau of Medical Devices estimates that there may be more than 2,000 manufacturers producing over 12,000 distinct functional types of devices (Banta, Brown, and Behney 1978). Standards setting is likely to absorb considerable agency resources, particularly since the standards must be periodically reviewed to reflect new medical, scientific, and technological data. The law also requires Class II firms to undergo plant inspection once every two years, which is bound to be another costly undertaking. Despite FDA avowal of technical assistance to small firms, Stetler (1977) contends that the higher compliance costs have already made it necessary for smaller firms to leave the market or merge with larger ones. Concern has been expressed that product prices will rise, product development and competition will be stifled, and consumer benefits will be reduced.

STATE REGULATION

State regulation of medical care costs have been focused on certificate-of-need (CON) activities and hospital rate review programs. Both areas offer significant opportunities for controlling technology diffusion and utilization, but it is doubtful whether state regulatory agencies have either the resources or incentives to fully enact their legislative powers. Much of the problem can be traced to the dual role that the state must play in the health sector (Weiner 1978). As a purchaser and distributor of health services, the state has a genuine concern to assure that technological advances are available to its constituents. As a regulator, the state must respond to increasing medical costs and must make difficult resource allocation decisions. However, the states do not effectively "allocate" scarce resources because no budget constraints have been placed on their approval activities (National Academy of Sciences 1979a). Agencies are free to approve as many projects as they deem appropriate, and the costs of these projects are often spread throughout the nation.

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[2] Peterson and MacPhee (1973) conducted a limited study of the medical devices industry, and to date is the sole source of information about the industry. They conclude that: (1) the medical devices industry is characterized by high prices and profits, attributable to an inelastic demand for medical equipment; (2) product differentation is widely practiced and reinforced by buyer ignorance; (3) buyers are strongly susceptible to product promotion and show little concern for objective information when purchasing equipment.

The difficulties of state regulation can be readily illustrated by the limited success of CON legislation.[3] The argument for controlling capital expenditures seems fairly obvious. By limiting investment in new beds, plant, and equipment, there will be less of an incentive to fill unused hospital beds.[4] Reductions in hospital facilities also create an incentive to develop less costly methods of care, and encourage a more intensive utilization of the services already in place. CON laws generally govern nursing homes, ambulatory facilities, and laboratories, but most states do not regulate physician offices. CON programs have also established minimum cutoff points for the size of expenditure to be reviewed (Salkever and Bice 1979). The threshold for new beds and equipment ranges from $50,000 to $200,000; for equipment, the range is between $10,000 and $200,000. Ideally, a CON agency will make a well-informed judgment on the need and desirability of a proposed expenditure. Reviewers must consider the efficiency and usefulness of the proposed project, the approximate distribution pattern for service or equipment sought, the reasonableness of the financing arrangements, financial feasibility, adequacy of proposed staffing, competence of the provider, and overall quality of services to be offered (Cohodes, Cerf, and Cromwell 1978).

The empirical evidence on CON effectiveness indicates that hospital investment has not been significantly reduced (Cohodes, et al.

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[3] All states except Louisiana and Indiana have implemented CON laws. Two federal laws have reinforced the necessity for states to initiate CON regulation. P.L. 92-603 (Section 1122) provides that federal funds under the Maternal and Child Health, Medicare, and Medicaid programs may not be used to support unnecessary capital expenditures made by or on behalf of health care facilities that are reimbursed under such programs. Institutions pursuing investment projects in excess of $100,000 that have not received prior approval by designated agencies may be denied reimbursement (for the above programs) for depreciation, interest, and other associated costs. The National Health Planning and Resource Development Act (P.L. 93-641) mandates that all states enact CON laws by 1980 to be eligible for certain federal health funds. Each state must develop a CON process to be administered by a State Health Planning Resource Development Agency.

[4] Roemer's law states that the supply of beds creates a demand for them. The reasons for this are twofold: (1) physicians derive a significant portion of their income from the provision of hospital-based care; (2) patients have the option of demanding medical care, but it is the physician who makes choices regarding appropriate techniques for treating his patients.

1978; Cromwell, et al. 1975; Dolan 1977; Lewin and Associates 1976; Rothenberg 1976; Somers 1973). Salkever and Bice (1979) conclude that CON laws may have constrained expansion of the number of beds, but investment seems to have been redirected into modernization efforts, new equipment, and other quality enhancing projects. The reasons for this redirection of investment can be traced to the constraints and political pressures that accompany regulatory activity. It is widely acknowledged that regulation will often lead to perverse behavior by both the regulator and the regulated firm.[5]

One of the most crucial problems facing CON agencies is the lack of expertise in planning activities. Most CON laws have only recently been developed, and the information required for intelligent agency decisions can only be obtained at considerable cost. This is particularly true for services and equipment, where evaluations on efficacy, safety and appropriate utilization standards are often conflicting or nonexistent (Bauer 1978a). On the other hand, bed standards are widely available, though often outdated and unreliable. Given limited agency resources, the image of "successful" regulation will be more evident through the control of bed supply than through the control of new services and equipment. Denials of requests for new services often provoke providers to initiate costly appeals and legal action, which depletes agency resources and threatens their credibility. If health providers possess more political power and are at an informational advantage, it is likely that the providers will exert undue influence on regulatory review decisions (Noll 1975). Furthermore, the regulator's authority is limited to only designated types of institutions and investments. This limitation will divert provider investment into the unregulated portion of the industry and hamper cost containment objectives. For instance, hospitals may prefer to invest in projects that fall below the review thresholds or enter into equipment lease arrangements (McCaffree and Bice 1980). Only seven states regulate the acquisition of equipment by private physicians, and there is evidence that sophisticated equipment (particularly CT scanners) is increasingly being purchased for use in private offices (Office of Technology Assessment 1978).

Hospital rate review commissions are quite heterogenous in function and scope. Most programs are aimed at controlling increases in operating costs from new programs and services, while others emphasize improved hospital management or phasing out underutilized beds and services (Bauer 1978b). The programs may be operated by independent commissions, Blue Cross plans, or operational departments of state governments. In areas where retrospective rate reimbursement is used, paying a hospital its reported costs or charges does little to encourage hospital efficiency.[6] Prospective reimbursement actually imposes a budget constraint on the provider. This can be done through a preliminary budget review, whereby an approved budget is translated into prospective rates, or through a formula mechanism where past years' cost experiences determine allowable rates. If hospitals know their payment rate before rendering services, resource allocation would become a necessity and the hospital would have an incentive to produce services more efficiently. However, with the exception of Rhode Island,[7] most rate commissions do not attempt to control the volume of services offered. The programs do not identify and reduce excessive lengths of stay or reduce hospitalization costs associated with inappropriate patient care (such as unnecessary drugs, tests, and surgery). Since most rate setting bodies strive to moderate unit (average) cost increases, reductions in the use of equipment and services would merely push up unit costs for patients who most require acute inpatient services. Large increases in unit costs may lead to the elimination of seemingly underutilized services and equipment. Since physicians are reimbursed at a higher rate for technology-based (versus personal service-based) care, they would have reason to be concerned if the services were no longer available in their hospital. Hellinger (1978) notes that studies of prospective reimbursement effectiveness have shown that this method does not significantly reduce hospital inflation. Any cost cutting that is accomplished does not originate from physician-controlled services but rather from administrator-controlled services.

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[5] For a detailed discussion of the political economy of CON regulation, see Noll (1975) and Salkever and Bice (1979).

[6] Hospital efficiency is not easily defined. Bauer (1978a) states that the lack of performance standards is the most difficult obstacle for rate-setters. It is impossible to identify or quantify the actual product being produced, and even if such a measure could be defined, it is not clear what types and amounts of imputs would be efficient for producing the output.

Many of the problems facing rate commissions are similar to those of CON agencies. For example, rate commissions find information acquisition expensive and are not eager to provoke extensive litigation when providers are denied a rate increase. Providers are better prepared to defend price increases and consumers do not want health costs controlled at the expense of service reductions in their own areas. Additionally, the rate control function is not a uniform procedure in any state. In a majority of programs, only charges reimbursed by Medicaid and Blue Cross patients are governed. Hospitals may simply "pass on" actual costs to patients who are not insured by these agencies. In some states compliance with agency decisions is voluntary and hospitals are free to drop out of the program.

PROFESSIONAL STANDARD REVIEW ORGANIZATIONS

Professional Standard Review Organizations (PSRO) were legislated in 1972 (P.L. 92-603) with the specific purpose of eliminating unnecessary hospital utilization by Medicare and Medicaid recipients.[8] PSROs are responsible for assuring that the services provided are: (1) medically necessary; (2) of a quality that meets professional standards; and, (3) provided at the most economical setting consistent with quality care (Goran 1979). As interpreted by the original lawmakers, the legislation would lead physicians to more carefully evaluate whether a patient needed to be hospitalized and to consider treatment alternatives that would utilize fewer medical resources (Blumstein 1978). Lower hospitalization rates would reduce the use of expensive hospital-based, technological services by substituting more "economical" treatment alternatives.

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[7] Rhode Island imposes a yearly statewide limit on increases in aggregate gross operating expenditures of voluntary hospitals.

[8] The PSRO program also covers services rendered under the Maternal and Child Health and Crippled Children's programs. It is administered by the Health Standards and Quality Bureau of the Health Care Financing Administration.

Physician opposition to PSRO legislation has strongly eroded its function as a cost containment effort. One of the major areas of contention has been the role of the National Standards Professional Review Council (NSPRC) in assisting individual PSROs to utilize and apply professional standards of care. The sponsors of the legislation felt that introduction of NSPRC expertise would lead to a decrease in unnecessary care. However, the PSRO Program Manual states that PSROs can choose to develop their own norms, and there is no mention of approval by the National Council (Havighurst and Blumstein 1975). In addition, physicians felt that National Council guidelines would effectively inhibit their professional autonomy.

P.L. 92-603 calls for the use of economic concepts in the formulation of norms, but it was generally acknowledged that in situations where cost and quality were at odds, PSROs would have to decide in favor of quality. Indeed, in the initial planning stages of PSRO legislation, Health, Education and Welfare (HEW) officials were forced to emphasize the quality aspect of the program in order to garner medical profession approval. The quality imperative of PSRO legislation also implies that "medically necessary" care justifies the use of any test or procedure that would improve treatment outcome, however slight. Therefore, an inconsistency exists between PSRO quality and cost containment objectives. A more profound problem, however, is that "economical" medical care defies definition. The treatment of illness cannot be restricted to a single process whereby a minimum combination of inputs is used to achieve a maximum output. Physicians have diverse perceptions as to the most effective method of treatment, and generally do not balance treatment costs against treatment benefits. The ethics code of the American Medical Association (AMA) states that "while physicians should be conscious of costs and should not provide or prescribe unnecessary services ...concern for the patient and the quality of care....predominates. Scientific studies.....can aid in the understanding.....of cost-effective (care)" (American Medical Association 1978b). Consequently, whatever professional norms of care an individual PSRO develops will be a biased toward the "quality" imperative, implying more intensive technology utilization. To date, there have been no attempts to assess how PSROs influence technology-based services. However, the Health Care Financing Administration has recently funded ten demonstration projects in order to determine PSRO effectiveness in ancillary service review (U.S. DHEW 1979).

Available research on PSRO performance has been methodologically too weak to provide any definitive conclusions about the program. Even the best studies (Ginsberg and Koretz 1979) provide no evidence that the programs are effective in reducing hospital utilization or costs. It appears that program net savings are considerably below program costs. Many observers feel that physician control of PSROs is limiting their effectiveness, since drastic cuts in hospital admissions and services would be inimical to physician financial interests (Blumstein 1978).[9]

PROPOSALS FOR CONTAINING TECHNOLOGY-ASSOCIATED COSTS

Enthoven and Noll (1977) point to the failures of the certificate-of-need process and to the failures of regulation in other sectors of the economy as evidence that an alternative method of controlling costs must be found. Regulatory agencies are not structured to correct the basic causes of a problem, but rather must focus on attacking the symptoms. Enthoven and Noll advocate an entire restructuring of medical care to a system of fixed prospective per-capita payments related to predicted medical need and ability to pay. However, Berman and Maloney (1977) state that the present third-party payment fee-for-service system will not be easily and quickly dismantled. The choice at present is not whether there will be regulation, but whether regulatory policies can be designed that reduce distortions in the medical marketplace. The best policy seems to be a gradual reduction of regulatory activities combined with structural changes in the existing medical care delivery system. But the relative merits of alternative solutions are constrained by the uncertainty surrounding the mechanism that links technology to rising health care costs. Prolific biomedical research (which is largely publicly funded) may simply increase the pressure for the private sector to develop and market tangible new products and services. Also, we do not have a very good understanding of the diffusion process, i.e., why and how health providers decide to adopt new technology.[10] The following sections will discuss the difficulties encountered in formulating both regulatory and non-regulatory solutions to technology-associated costs.

Physician Reimbursement Controls

Medicare and Medicaid currently establish maximum reimbursement levels for routine services, and Medicare reimburses only for approved medical procedures. Some Blue Shield programs have negotiated fee schedules that are accepted as payment in full by physicians. The Medical Necessity Program (sponsored by Blue Cross/-Blue Shield) has identified over 100 surgical and diagnostic procedures that are judged obsolute, not clinically reliable, or lacking in scientific evidence to support their effectiveness (McNerney 1980). Physicians must give specific instruction and provide justification before they are reimbursed for these procedures. For the most part, however, present reimbursement controls reward physicians (and hospitals) with higher revenue as they provide more services, and cost-effectiveness is generally not a criterion in reimbursement.[11] For example, Medicare and Medicaid have no limits on reimbursement for ancillary services, and it has been claimed that this arrangement provides strong incentives to increase ancillary care (Wagner 1979). The Medical Necessity Program raises the question of whether the new technologies replacing obsolete ones are more medically effective; the new or alternative technology could also be more technically sophisticated and therefore more expensive. Furthermore, Blue Cross negotiated fees are set at "usual, customary, and reasonable" levels, which have been shown to be inflationary. Reimbursement for new procedures is usually based on historical precedent and not on the actual resource cost of performing the procedure (National Academy of Sciences 1979a).

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[9] Both the Reagan administration and the AMA favor the abolition of PSROs.

[10] It has been hypothesized (National Academy of Sciences 1979b) that hospitals possess a variety of institutional objectives. These may include the maximization of service quality, service quantity, hospital prestige, physician income, or some combination of these. If patients identify hospital quality with the availability or number of sophisticated services, then hospitals wishing to maximize quality will emphasize capital acquistion. A second theory asserts that hospitals do not form objectives, but rather make politicized decisions based on the dominance of competing interest groups. The "physician dominance" theory suggests that physicians will dominate hospital decision making since they provide the primary inputs into patient care management. Technology - oriented physicians will not supply an adequate patient load to hospitals that do not meet technology acquisition requests.

It has been suggested that manipulating physician fee schedules would be an appropriate method of altering physician technology utilization (Gaus and Cooper 1978). A technology-sensitive fee level would make it less profitable for physicians to use expensive, marginally effective technology. Initially, reimbursement rates might be set so physicians would receive no or lower reimbursement for unproven technology. As new procedures and equipment are proven cost effective, fees could be increased. Adoption of new technology would be slowed and used only when medically indicated. For those procedures already in place and for which efficacy and safety have not been determined, reimbursement could also be restricted.

The major hurdle to implementing such a policy is the difficulty in evaluating "cost effectiveness." As will be discussed below, technology assessment is time consuming and highly controversial. It is almost impossible to prove that a particular service or procedure will not benefit any one. Furthermore, there is no guarantee that proven technologies will be properly utilized. If physicians are reimbursed only when they provide services according to a well-defined protocol, it is likely that inflexible medical practices and an expensive, cumbersome bureaucracy will emerge.

Hospital Reimbursement Controls

Prospective reimbursement in the form of caps on hospital revenue or operating cost increases could be an effective method of controlling technology-related costs. As mentioned previously, such a method has been implemented by the Rhode Island rate review commission. The advantage of expenditure caps is that they can effectively reduce the acquisition and utilization of technology, which is not possible with current physician reimbursement schedules. Under such a system the hospital retains its discretion to invest in new technology, but it would have to be done with caution since other hospital projects will be competing for limited funds. Hospitals will have more of an incentive to adopt cost-saving and cost-effective methods of care, as well as to cooperate with other hospitals in the consolidation of facilities and services. Needless to say, some reliable method of determining appropriate revenue or cost caps would be needed. Applying uniform standards would penalize hospitals with complex case-mix loads. Expenditure controls will also promulgate requests by hospitals for "special consideration" and accusations that necessary life saving equipment is being denied to worthy populations. Expensive cases may be diverted to public hospitals, and it is quite possible that technology-based care will be shifted to outpatient clinics and private physician offices. Medical care will be effectively rationed to those who can afford to pay for office-based services, since most insurance policies do not reimburse office care as extensively as inpatient hospital care.

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[11] Some Blue Cross plans have made reimbursement for CT scans conditional upon appraisal of their efficiency.

Capital Expenditure Controls

CON authority could be expanded to include physician offices and clinics, and the minimum threshold for expenditure review could be reduced. But expanding the CON process will not solve its regulatory inefficiencies. The review process would continue to be dominated by health care institutions, and the need for appropriate review standards and planning activities would not be lessened. Even if present capacity regulations were guided by strong national and local standards on bed acquisition and technology adoption, state agencies are prone to review requests with consideration for special circumstances.[12] Furthermore, equipment acquisition guidelines are of little value without protocol procedures. As mentioned previously, protocol procedures would be extremely costly to devise and implement.

An alternative solution to the CON process would be to impose an annual national limit on capital expenditures.[13] The national limit would be allocated to the states or Health Systems Agencies (HSA) and the reviewers would make choices among competing projects in their areas. The recipient institutions, responding in a manner similar to hospital expenditure controls, would utilize funds according to their specific objectives.

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[12] The CT scanner has been more fully evaluated than most technologies since it is a very visible and expensive piece of equipment. Despite the promulgation of national guidelines for scanner acquisition and use, the states have adopted their own criteria and local acquisition often reflects current medical practices (Office of Technology Assessment 1978b).

[13] This solution was proposed under President Carter's 1977 Hospital Cost Containment bill.

National capital expenditure limitations pose a dilemma for regulation. On a national level, more definite standards for determining medical need would be required for a fair allocation of funds. On a regional level, states or HSAS would be crippled by inadequate need projections and lack of review criteria. Resource allocation would become politicized through coalition and compromise and medical distribution would likely suffer. Regional political power would become a primary input for the initial distribution of funds, and medical institution power would primarily determine local allocations.

Warner (1978) hypothesizes that controls specifically geared to capital inputs would invite more invidious consequences than hospital revenue or cost controls. One would expect to see a decrease in capital-intensive technology acquisition and diffusion, but the ceiling would fail to distinguish between cost-increasing and cost-decreasing technology. Operating costs would no longer be a decisive factor for capital acquisition and existing technology would be used more intensively. A restrictive ceiling might lead to reliance on second-best, less capital-intensive alternative technologies. There would also be a decrease in the development of high capital cost technology, regardless whether it is cost-saving or efficacious. The medical technology industry would be confronted with additional risks in product development, leading to a virtual stagnation of medical innovation[14].

Physician And Consumer Education

The Health Professions Educational Assistance Act of 1976 calls for a decline in the ratio of physician specialists and emphasizes more primary-care physician training.[15] This goal can be accomplished by limiting specialist residency positions and by stipulating primary training as a condition for medical school educational grants. However, it is not certain whether limiting the number of specialists will decrease the use of technology. There is evidence that non-specialists rapidly adopt existing technologies and procedures, whereas specialists concern themselves with the newer and more sophisticated procedures (National Academy of Sciences 1979a). Such a policy might affect the diffusion of new technologies, but this will undoubtedly depend on how "sophisticated" these services are.

Non-physician support personnel have become an essential input in the operation of many technologies. The specificity of these occupational categories has been mandated by personnel licensure laws, which are primarily intended to assure quality health care by reserving certain functions to well-trained individuals. However, it is felt that too many narrow licensing categories increase the costs of medical care by fixing staffing patterns and assignments, which in turn reduces worker mobility and increases training costs (Needleman and Lewin 1979). The rapid changes in technology further exacerberate the necessity for larger and more expensive manpower requirements. As a result, the Department of Health, Education, and Welfare (now called Health and Human Services) has advised that states restrain new occupational licensing and instead stress the development of certification programs. Certified personnel can be utilized with more flexibility in health care institutions.

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[14] These risks would intensify the already increased risks and costs of product development under the Medical Devices Amendment.

[15] For example, several observers (Bunker 1970; Fuchs 1969; Lewis 1969;) hypothesize that an excess number of surgeons in the U.S. have promulgated an excess number of surgical procedures. Higher surgical rates in geographic areas have been correlated with relatively more surgeons in these areas but not with incidence of disease.

Health-cost consciousness can be raised by information dissemination strategies (Cooper and Gaus 1977). Medical schools should give more emphasis to cost-effectiveness in clinical training, and the consumer should be given indications of medical technology limitations before undergoing diagnostic and treatment procedures. One method of providing consumers with additional knowledge is the Blue Cross Second Opinion Surgery Program. Although the evidence of program success has been limited (American Medical News 1981; McCarthy, Finkel, and Kamons 1978), it appears that the majority of persons who receive non-confirming second opinions do not have surgery performed. But the implications of this program are not clear since only a small percentage of Blue Cross subscribers have been monitored by these studies. Program results are further biased when patient participation is voluntary. Those who willingly seek out a second opinion may be highly skeptical of surgery to begin with. On the other hand, a confirming second opinion might encourage people to undergo surgery they otherwise would have rejected.

Competition

The prepaid health plan limits reimbursement for patient services to a fixed per capita amount regardless of the value of services rendered. Efficient providers are rewarded by surplus funds, but the degree of financial risk the provider bears will depend on the specific plan design. In the traditional prepaid plan, physicians and support personnel are directly hired by the Health Maintenance Organization (HMO) on a salaried basis. The HMO is at risk for costs which exceed premium income, providing a strong incentive to reduce unnecessary hospitalization and to substitute non-physician inputs in patient care. In the independent practice association, physicians provide care in their own offices, but are reimbursed by the HMO at a discount rate and generally are not at financial risk.

Although the HMO Assistance Act of 1973 encourages the growth of comprehensive prepaid plans, only about three percent of the U.S. population is currently enrolled in such plans. There do not seem to be significant legal obstacles to HMO expansion, and CON legislation has not been biased against their formation (Cohodes, Cerf, and Cromwell 1978; Goldberg and Greenberg 1977). An alternative explanation for the low HMO participation is that open enrollment, community rating, and substantial minimum service requirements have placed them at a competitive disadvantage to insurance provision in the fee-for-service system. It also appears that the public prefers the close physician-patient relationship that fee-for-service care provides.

There is strong evidence that prepaid group plans provide services at a lower cost than the fee-for-service sector (Wolinsky 1980). Hospitalization rates are lower and lengths of stay shorter. However, evidence on the diffusion and utilization of technology in the prepaid sector is lacking. Since most HMOs do not own their own hospitals, equipment decisions are made by the hospital under contract to the HMO with reference to a wider population. But critics of capitation plans argue that there is no confirmation of efficiency, especially since members tend to be younger, better educated, and generally healthier than most of the population. Concern has also been expressed that HMO physicians may skimp on essential medical services and do not provide as high quality care as the typical fee-for-service physician (National Academy of Sciences 1979a).

If the population seems adverse to joining a capitation plan, what policies would be appropriate for stimulating enrollment? Enthoven and Noll (1977) suggest that elimination of the open-ended tax exclusion of employer contributions and tax deductibility of premiums would force consumers to shop for less costly health plans. A refundable tax credit would be provided to those who enroll in a qualified capitation plan. Those who prefer alternative, more expensive plans would pay additional costs out of their own pockets. The poor would receive health plan vouchers that could be used to pay premiums to a qualified plan of their choice, and the Medicare program would pay an actuarially adjusted fixed prospective periodic payment for each elderly individual enrolled. Qualified HMOs would be required to participate in an open enrollment period and accept applicants regardless of age or health status. Full information disclosure by the plans would help consumers choose the one that best meets their needs, and premium costs would be based on local experience for each market area.

The "competitive effect" of a nation-wide system of capitation plans would no doubt serve to reduce inappropriate medical care. For instance, there is evidence that Blue Cross plans in some areas have reduced hospital utilization in response to HMO presence (Goldberg and Greenberg 1977). The major question is whether a restructuring of our health payment system would lead to greater inequity in the provision of medical services. Conceivably, consumers who are willing and/or able to pay for alternative health plans would reap the benefits of the technology associated with higher quality care. The capitation sector would be slower and more cautious in its use of medical procedures and services, and this response might become associated with lower quality care. Given the time needed for implementation of a national capitation plan, there would be no end to the number of ways that could be devised to satisfy consumer preference for a traditional delivery system.

Medical Liability

Although no empirical studies have assessed the effects of defensive medicine on technology utilization and health care costs, it is difficult to perceive that a relationship does not exist. In 1978, an

AMA survey revealed that a majority of physicians believe that unnecessary tests are ordered as a hedge against malpractice suits. A 1976 study of California physicians revealed that the malpractice situation caused a majority of physicians to increase the use of X-rays, consultations, and hospitalizations as a precautionary measure, and that many of the procedures were not medically necessary (Leopold and Langwell 1978).

The National Commission on the Cost of Medical Care (American Medical Association 1978a) has suggested that the presence of an authoritative body of professional opinion for providers and courts would alleviate the disparity as to what constitutes good diagnosis and treatment. For reasons discussed elsewhere in this paper, a comprehensive guide to standards of appropriate care could not easily (and probably would not) be implemented. An alternative solution would be a re-examination of medical liability procedures. Courts and state legislatures could discourage casual and unjustified malpractice suits by requiring pre-trial screenings or by placing liability claims outside the traditional court room setting.

The Role Of Research And Technological Assessment

The material presented in this paper has demonstrated two main points. First, technology is extremely difficult to control once it has been introduced to health care providers. Second, the uncertainty surrounding technology's effect on health care status, health care costs, and society in general has crippled even the most well-designed and well-intended policy measures.

If the technology adoption and diffusion process cannot be pinpointed, a possible solution would be to limit the development of new technologies while they are still in the research stage (Maloney and Rogers 1979). But Rettig (1976) points out that the technology development process is lengthy, often international, and multi-disciplinary. Both the public and private sectors and a multitude of institutional pathways are typically involved. A relatively simple policy aimed at reducing publicly funded basic biomedical research would be confounded by the inability to predict whether outcomes proliferate "good" or "bad" effects on health status and costs.

A more feasible approach would be to initiate a formal and well-coordinated system for the development and dissemination of medical technology assessment. Technology assessment is loosely defined as the study of the technical, economic, social, legal and ethical aspects of technology. The Office of Technology Assessment (OTA) (1976a) has adopted a more limited definition to stress social issues (rather than technical), specifically the unintended, indirect, or delayed societal impacts.[16] However, the former definition is preferred for the present.

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[16] Rapid technological innovation makes it extremely difficult, if not impossible, to evaluate short-term societal impact, let alone the long-term. The feasibility of societal impact studies is limited, and the resources used for social assessment would probably be better used in the technical arena.

Technology assessment is performed in a variety of settings, but the best method for ascertaining technical efficiency is probably the randomized clinical trial. It has been estimated that only 10 to 25 percent of all procedures used in medical technology have been tested by clinical trial (Office of Technology Assessment 1978a). The major reason for this lack of protocol is that clinical trials tend to be costly and lengthy. The National Institutes of Health estimates that in fiscal year 1975, it provided approximately $641.8 million to support 755 clinical trials. Completion of the trials was estimated to cost another $345 million. The Food and Drug Administration estimates that private drug firms spend between one and four million dollars to bring a drug to the market after it has been developed in the laboratory. Ethical considerations require that potentially unsafe new technologies be tested on selected special populations, which confounds the applicability of test results to a wider population. When early evidence shows promise for a new technology, the physician has an imperative to provide his patients with the beneficial treatment regardless of whether it has been definitively tested. Clinical investigations proceed over a long period of time and informal evidence on the effectiveness of a technology may speed its diffusion before the formal evaluation is completed, undermining the continuance of the trial. And finally, rapid technological obsolescence may invalidate the results of current trials.

In the absence of well-controlled and well-designed clinical investigations, knowledge of the effectiveness of new technologies is obtained through informal channels during the diffusion process. The Medical Devices Amendment will, hopefully, successfully monitor the technical effectiveness of new medical devices that must meet premarket approval. But there is still a plethora of equipment, techniques, and drugs that do not fall under the auspices of the Food and Drug Administration.

Even though clinical studies seem to be in short supply, a large number of agencies are involved in health technology assessment. However, their interests are narrowly focused and their methods of trial are limited to specific applications. For instance, the Alcohol, Drug Abuse, and Mental Health Administration conducts basic and applied research relevant to the treatment of mental illness, drug abuse, and alcoholism. The Health Services Administration conducts research activities and efficacy and safety assessments for the treatment of Hansen's disease and insensitive limbs. The National Center for Health Services Research undertakes a broad range of research and specializes in cost-benefit and cost-effectiveness studies.[17] The Veterans Administration issues regulations, manuals, and circulars related to the efficacy and safety of medical technologies utilized by its Department of Medicine and Surgery, and sponsors a wide variety of research activities and clinical trials. The

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[17] Cost-effectiveness and cost-benefit analysis are similar analytic procedures. The main difference is that in cost-effectiveness, the effects of a program are not valued in dollar terms, but rather are measured in some other unit (such as years of life gained).

Department of Defense sponsors research, development, and assessment activities in those areas that primarily affect the military, such as field medical care, military environmental hazards, and troop disease prevention. Finally, there are numerous activities in the private sector. The American Society for Testing and Materials, the Association for the Advancement of Medical Instrumentation, and several professional medical societies are also actively involved in technology assessment.

As has been stressed in the previous sections, technology cost-effectiveness is generally not a consideration in the reimbursement or adoption process. The OTA (1976b) investigated the feasibility of cost-effectiveness analysis and concluded that it should not be used as the sole tool for reducing or controlling overall expenditures for medical care. Cost-effectiveness analysis exhibits too many methodological limitations. There are no set combinations of specific analytical elements that form a standard cost-effectiveness analysis. It is difficult to identify valid measures of patient outcome, to determine the costs unique to the application of a technology, and to assign dollar values to benefits. For example, the cost-effectiveness of intensive-care units has been estimated to vary by over a thousand-fold among different patients (Bunker, Barnes, and Mosteller 1977).

The lack of a market for cost-effectiveness studies has been illustrated in the paper. Hospitals, physicians, and regulators do not feel they should be required to use a problem-riddled, inexact methodology in formulating treatment methods and making allocation decisions. There has been limited use by PSROs and Health System Agencies, but most programs have no clear motivation for employing cost/benefit information. Despite the dismal picture, the OTA feels that in an era of limited health resources, cost studies should play an increasing role in establishing priorities for resource allocation. The refinement of cost-effectiveness methodologies should be encouraged, and reimbursement criteria should consider cost-effectiveness on an informal basis. Even if complete measures of all benefits and costs are not obtainable, such studies can be enlightening and can lead to more informed decisions.

It has been repeatedly stated in this paper that regulatory agencies and health care providers are handicapped by the inadequacy of technology-related data to aid their adoption and utilization decisions. It has been pointed out that much of the problem is due to a lack of coordination, and not a lack of knowledge (Egdahl and Gertman 1978). Responsibility for technology funding and monitoring is spread out among all three branches of the federal government, and at the state and local levels as well. As a result, federal health care providers have not had appropriate direction from agencies operating under related and sometimes contradictory mandates. In 1978, the National Center for Health Care Technology was created under the Health Services Research, Health Statistics, and Health Care Technology Act. This agency was given a specific mandate to: (1) assess high priority health care technologies; (2) coordinate all research, evaluations, and demonstrations respecting the assessment of health care technologies undertaken and supported by the Department of Health and Human Services; (3) make recommendations on reimbursement policy; (4) analyze cost-effectiveness and social, ethical, and economic implications; and (5) support extramural grant and contract programs. Since the Center is relatively new, no valid assessment of its performance can be given. Its greatest potential lies in the fact that a less fragmented, more systematic approach will be applied to the management of health technology affairs. Its greatest obstacle, however, is that the Reagan administration has proposed merging the agency with the National Center for Health Services Research without granting the Center any additional funds for assessment activities.

Another effort aimed at assimilating technology-related information is the NIH Concensus Development Program (Perry and Kalberer 1980). Initiated in 1976, the program invites panels of experts to discuss and reach general agreements on the safety, efficacy, and appropriateness of medical products, drugs, and devices. The program also distributes consensus statements to PSROs, the media, medical journals, and Health System Agencies.

SUMMARY AND CONCLUSIONS

There are two major issues that this paper has addressed. The first is that efforts to formulate a comprehensive medical technology "policy" are crippled by uncertainty about the true costs and benefits of technology, uncertainty about the impact of technologies on medical practice, the lack of data on emerging technologies, and the infeasibility of technological protocol. The second issue is more positive. The use of technology-based services is encouraged by physicians and demanded by patients. This is reinforced both by the third-party reimbursement system and the financial benefits that accrue to hospitals and physicians from technological services.

If health care observers cannot be certain of the role that technology plays in rising health care costs, then it might be helpful to look at the issue in a larger context. Technology is an inextricable part of the American health care delivery system. Blaming technology utilization for rising health care costs is similar to blaming health care utilization for the rise in costs. Therefore, it seems that the failure of regulation to adequately slow down technology utilization is part of a larger problem. Medical care costs cannot be controlled until consumers and physicians understand the realities of resource allocation. This does not imply less medical care, but rather a more efficient use of available resources. The difficulty, of course, lies in our ability to find a rational method of allocating limited resources. Economic theory praises the mechanism of the competitive market, but economic pragmatism has taught us otherwise. Replacing the current health care delivery system with a pro-competitive strategy does not necessarily mean an end to regulation. Competition must be fostered to assure that quality services will be provided on an equitable basis. Until such a solution is achieved, the best policy would be to incorporate limited regulatory activities with some alternative techniques. These would include altering reimbursement methods and malpractice procedures, educating physicians and consumers, and stressing the continued development and dissemination of technology assessment.

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Part II

Selected Socioeconomic Data on Health

The collection and organization of data for this section
was performed by David J. Schroder, Ph.D.

Characteristics of the United States Population

An essential element in any analysis of the health services delivery system is a description of the individuals who demand and receive these services: the consumers of health care. Such a description should encompass both demographic and health characteristics of the population.

Each member of the population is a potential consumer of health care services. Theoretically, demand is generated only by individuals. However, organized third parties such as insurance companies, the government, and labor unions also exert pressure on the demand for health care services. The rising trend in demand for health care services can be partially attributed to such factors as population growth, changes in the age and race composition of the population, increased awareness regarding health, and the ability of the medical profession to provide expanded and improved services. The most influential factors in the rising trend in demand, however, have been those which have enabled purchasers of medical care services to translate their wants into effective demand. Among these factors are increasing income, widespread comprehensive health insurance coverage, and the growth of government subsidies.

The following data provide a summary of the demographic charac-teristics of the population served by the U.S. health care delivery system.

- As of April 1, 1980, the total U.S. population was estimated at 227,021,000. This figure represents an 11.1 percent increase over the 1970 population estimate.
- Females accounted for 116,513,000 persons, 51.3 percent of the U.S. resident population in 1980.
- The median age of the U.S. population was 30.0 in 1980, up from 27.9 years in 1970.
- The population 65 years of age and over increased from 19,972,000 in 1970 to 25,544,000 in 1980, representing an increase of 27.9 percent.
- The population under 5 years of age is the only segment of the population which has shown a steady decrease in number since 1960, decreasing 19.6 percent between 1960 and 1980.

- The nonwhite population numbered 38,164,000 as of April 1, 1980, representing 16.8 percent of the U.S. population. Females accounted for 51.9 percent of the nonwhite populace.*

- The median age of the nonwhite population in 1980 was 24.3, seven years younger than the median of the white population.*

- The percentage of households with incomes under $3,000 decreased from 15.8 percent in 1970 to 6.2 percent in 1978.

- In 1978, the median income of white households was $15,660. Nonwhite households had a median income of $10,130.

- Between 1970 and 1978 median income of nonwhite households increased by $4,408, while the median income for white households increased by $6,563.

- In 1978, the median family income in metropolitan areas of 1,000,000 people or more was $19,835, compared to $17,976 in metropolitan areas under 1,000,000 population and $15,287 in nonmetropolitan areas.

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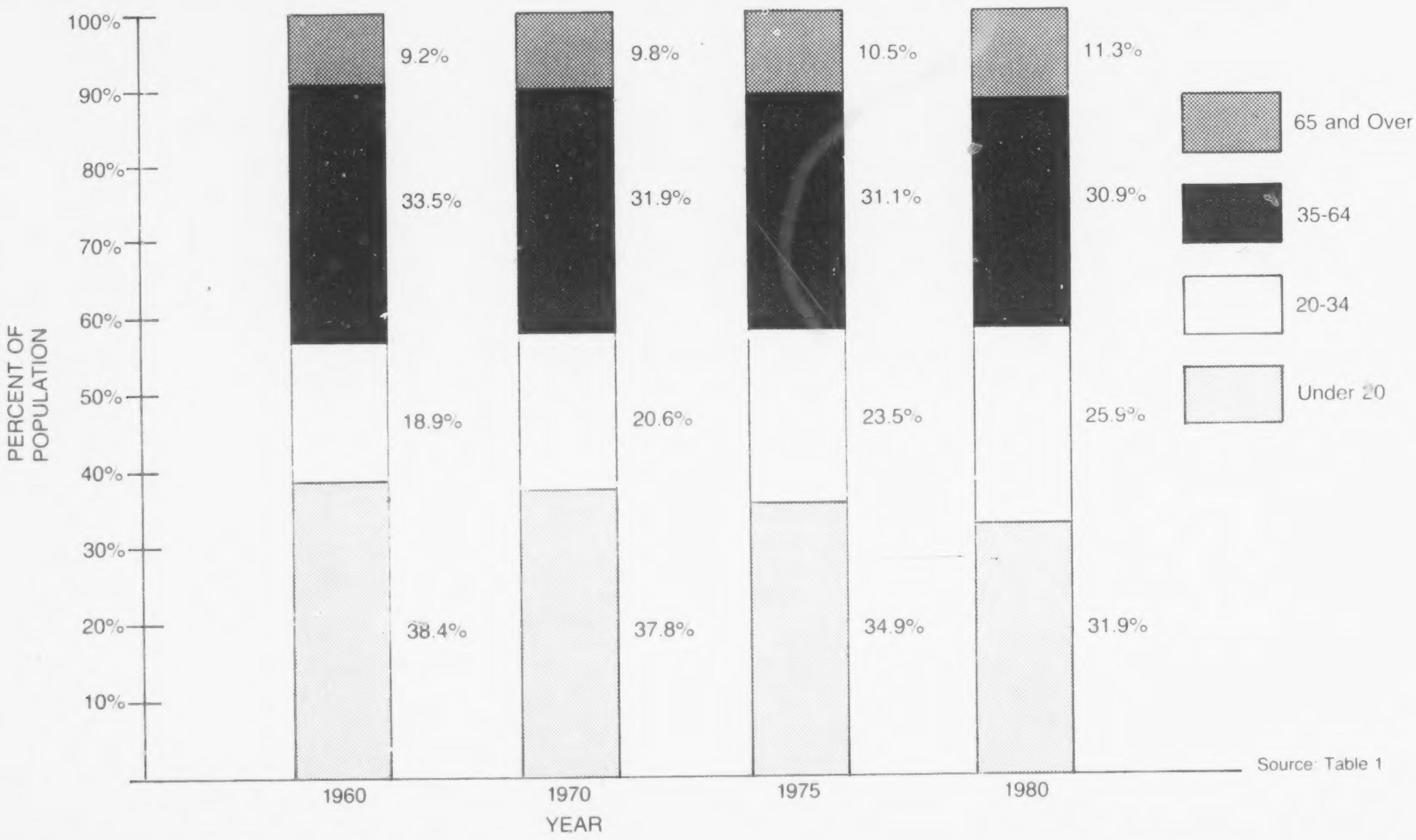
*These estimates do not include armed forces overseas.

Table 1—Age of the U.S. Population, Percent Distribution, and Rate of Change, 1960, 1970, and 1980

	Population (thousands)			Percent Distribution			Change 1970 to 1980	
Age (Years)	April 1, 1960	April 1, 1970	April 1, 1980	April 1, 1960	April 1, 1970	April 1, 1980	Number	Percent
All ages	180,007	204,335	227,021	100.0%	100.0%	100.0%	+22,686	+11.1
Under 5	20,321	17,163	16,344	11.3	8.4	7.2	- 819	- 4.8
5 to 14	35,465	40,773	34,938	19.7	20.0	15.4	- 5,835	-14.3
15 to 19	13,334	19,183	21,220	7.4	9.4	9.3	+ 2,037	+10.6
20 to 24	11,063	17,027	21,523	6.1	8.3	9.5	+ 4,496	+26.4
25 to 34	23,007	25,146	37,252	12.8	12.3	16.4	+12,106	+48.1
35 to 44	24,181	23,213	25,694	13.4	11.4	11.3	+ 2,481	+10.7
45 to 54	20,503	23,254	22,803	11.4	11.4	10.0	- 451	- 1.9
55 to 64	15,574	18,603	21,700	8.7	9.1	9.6	+ 3,097	+16.6
65 and over	16,560	19,972	25,544	9.2	9.8	11.3	+ 5,572	+27.9
Median age	29.5	27.9	30.0	--	--	--	--	--

Source: U. S. Bureau of the Census: Estimates of the Population of the United States, by Age, Sex, and Race: April 1, 1960 to July 1, 1973. Current Population Reports Series P-25, No. 519:68-69, April 1974; Age, Sex, Race, and Spanish Origin of the Population by Regions, Divisions, and States: 1980. PC 80-S1-1:3, May 1981; personal communication, U. S. Bureau of the Census.

Figure 1—Percentage Distribution of U.S. Population by Age, 1960, 1970, 1975, and 1980



Source: Table 1

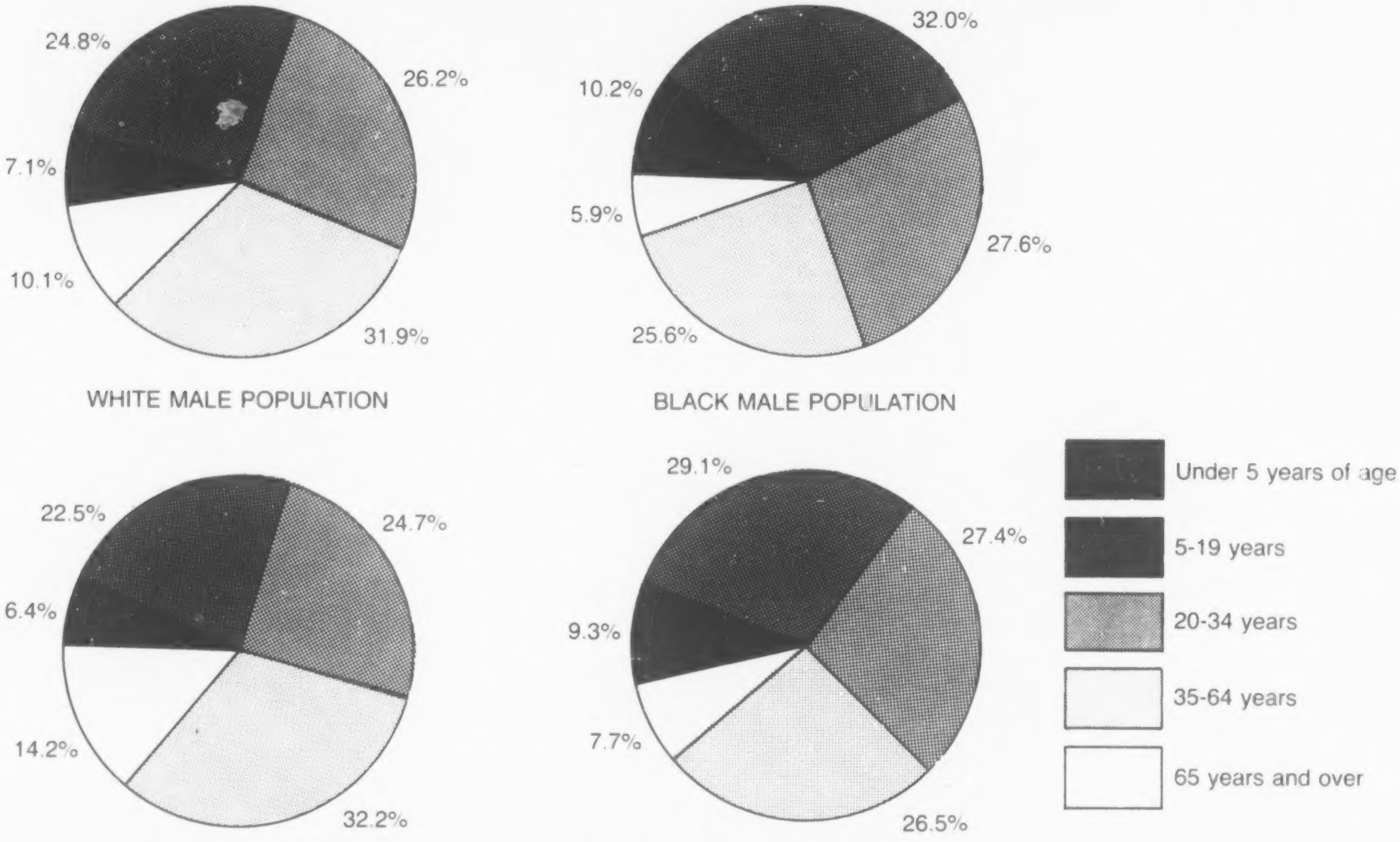
Table 2—United States Population by Age, Race, and Sex, 1980

	Number (thousands)				Percent			
	White		Black and Other		White		Black and Other	
Age (years)	Male	Female	Male	Female	Male	Female	Male	Female
All ages	91,670	96,671	18,363	19,801	100.0%	100.0%	100.0%	100.0%
Under 5	6,483	6,148	1,877	1,836	7.1	6.4	10.2	9.3
5 to 14	14,092	13,399	3,761	3,686	15.4	13.9	20.5	18.6
15 to 19	8,631	8,326	2,120	2,084	9.4	8.6	11.5	10.5
20 to 24	8,680	8,603	1,980	2,049	9.5	8.9	10.8	10.3
25 to 34	15,303	15,323	3,076	3,374	16.7	15.9	16.8	17.0
35 to 44	10,679	10,905	1,888	2,158	11.6	11.3	10.3	10.9
45 to 54	9,556	10,057	1,452	1,733	10.4	10.4	7.9	8.8
55 to 64	9,025	10,186	1,126	1,363	9.8	10.5	7.4	6.9
65 and over	9,220	13,724	1,082	1,518	10.1	14.2	5.9	7.5
Median age	30.0	32.6	23.7	24.9	--	--	--	--

Note: Data are resident population as of April 1, 1980. These figures do not include armed forces overseas.

Source: U. S. Bureau of the Census: Age, Sex, Race, and Spanish Origin of the Population by Regions, Divisions, and States:1980. Supplementary Reports PC 80-S1-1:3, May 1981.

Figure 2—Percentage Distribution of United States Population by Age, Race and Sex, 1980



WHITE MALE POPULATION

BLACK MALE POPULATION

WHITE FEMALE POPULATION

BLACK FEMALE POPULATION

Source: Table 2

Table 3—Households by Total Household Income and Race of Household Head, 1970 and 1978

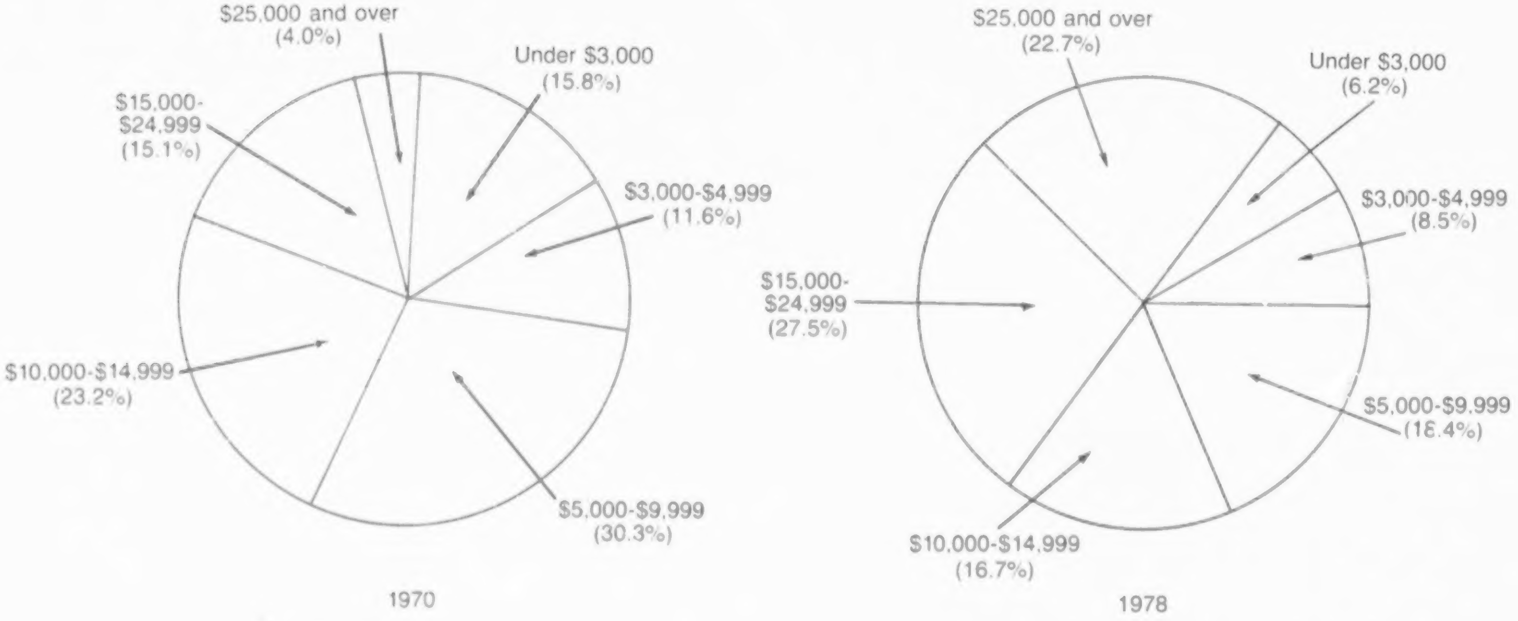
Total Household Income	1970[a] All Races	1970[a] White	1970[a] Black and Other	1978 All Races	1978 White	1978 Black and Other
Number Persons (thousands)	64,778	57,575	6,800	77,330	68,028	9,302
Percent	100.0	100.0	100.0	100.0	100.0	100.0
Under $3,000	15.8	14.5	27.2	6.2	5.3	12.8
$3,000 to $4,999	11.6	11.0	16.8	8.5	7.7	13.8
$5,000 to $6,999	11.8	11.4	15.2	7.6	7.2	10.0
$7,000 to $9,999	18.5	18.7	16.6	10.8	10.6	12.8
$10,000 to $11,999	11.0	11.4	7.7	7.1	7.0	7.6
$12,000 to $14,999	12.2	12.7	7.2	9.6	9.7	9.2
$15,000 to $24,999	15.1	16.0	8.1	27.5	28.4	20.7
$25,000 and over	4.0	4.3	1.3	22.7	24.0	13.1
Median Income	$ 8,734	$ 9,097	$5,722	$15,064	$15,660	$10,130

Note: In current dollars. Households as of March of the following year.

[a] For 1970, the number of households by race will not add to all races because the latter was adjusted to population controls based on the 1970 census. These controls are not available by race.

Source: U. S. Department of Commerce: Money Income in 1978 of Households in the United States. Current Population Reports Series P-60, No. 121:8, February, 1980.

Figure 3—Percentage Distribution of U.S. Households by Income 1970 and 1978



Source: Table 3

Morbidity and Mortality of the U.S. Population

Morbidity and mortality rates are frequently cited as indicators of the health status of the population. With economic and social improve-ments as well as advancements in medical technology, death rates have continued to decline and life expectancy for the general population has increased. Between 1950 and 1977 life expectancy has increased by approximately 4 years for males and 6 years for females. People who would have died of certain communicable diseases a number of years ago are living longer but are now susceptible to degenerative diseases. This fact is reflected in the increased morbidity rates for these diseases. Therefore, although life may be substantially prolonged, longevity often may be accompanied by severe disability. In addition, those persons suffering from chronic conditions are more susceptible to acute illnesses. These developments account for part of the increase in morbidity rates and also explain selected increased demand for medical care.

Highlights of selected health status indicators are:

- The average length of life for the U.S. population has increased 7.5 percent since 1950, from 68.2 years in 1950 to 73.3 years in 1978. In 1978, females had a life expectancy 7.7 years greater than males.
- In 1978, white males had an average length of life of 70.2 years, while males of all other races had an estimated average of 65.0 years. White females had an estimated average of 77.8 years, while females of all other races had an average length of life of 73.6 years.
- In 1979, the death rate for the U.S. population was 8.7 per 1,000 population.
- Heart disease was still the leading cause of death in 1979, accounting for 331.3 deaths per 100,000 population, representing 38.3 percent of all deaths.
- In 1978, the Middle Atlantic Census Division had the highest death rate due to heart disease (398.4 per 100,000 population), while the Mountain Census Division had the lowest(232.6 per 100,000 population).
- Data on days of disability per person in 1979 indicate that an average individual had 19.0 days of restricted activity, 6.7 days of bed disability, and 5.0 work-loss days per year.
- The number of restricted activity and bed disability days per person per year tends to decrease as income increases, regardless of age.

Table 4—Median Family Income by Area of Residence and Race, 1978

Type of Residence	All Families		White Families		Black Families	
	Number (thousands)	Median Income	Number (thousands)	Median Income	Number (thousands)	Median Income
United States	57,804	$17,640	50,910	$18,368	5,906	$10,879
Metropolitan areas	38,581	18,910	33,265	19,862	4,551	11,819
1,000,000 or more	21,586	19,835	18,173	20,792	2,913	12,274
In central cities	7,991	15,893	5,544	17,486	2,179	11,299
Outside central cities	13,595	21,746	12,629	22,049	733	15,668
Under 1,000,000	16,995	17,976	15,092	18,657	1,638	10,868
In central cities	7,642	16,625	6,317	17,869	1,202	9,869
Outside central cities	9,353	18,940	8,774	19,206	437	13,397
Nonmetropolitan areas	19,223	15,287	17,645	15,792	1,355	8,814
Non-farm	55.753	17,732	48,951	18,471	5,827	10,940
Farm	2,051	15,284	1,959	15,562	78	6,811

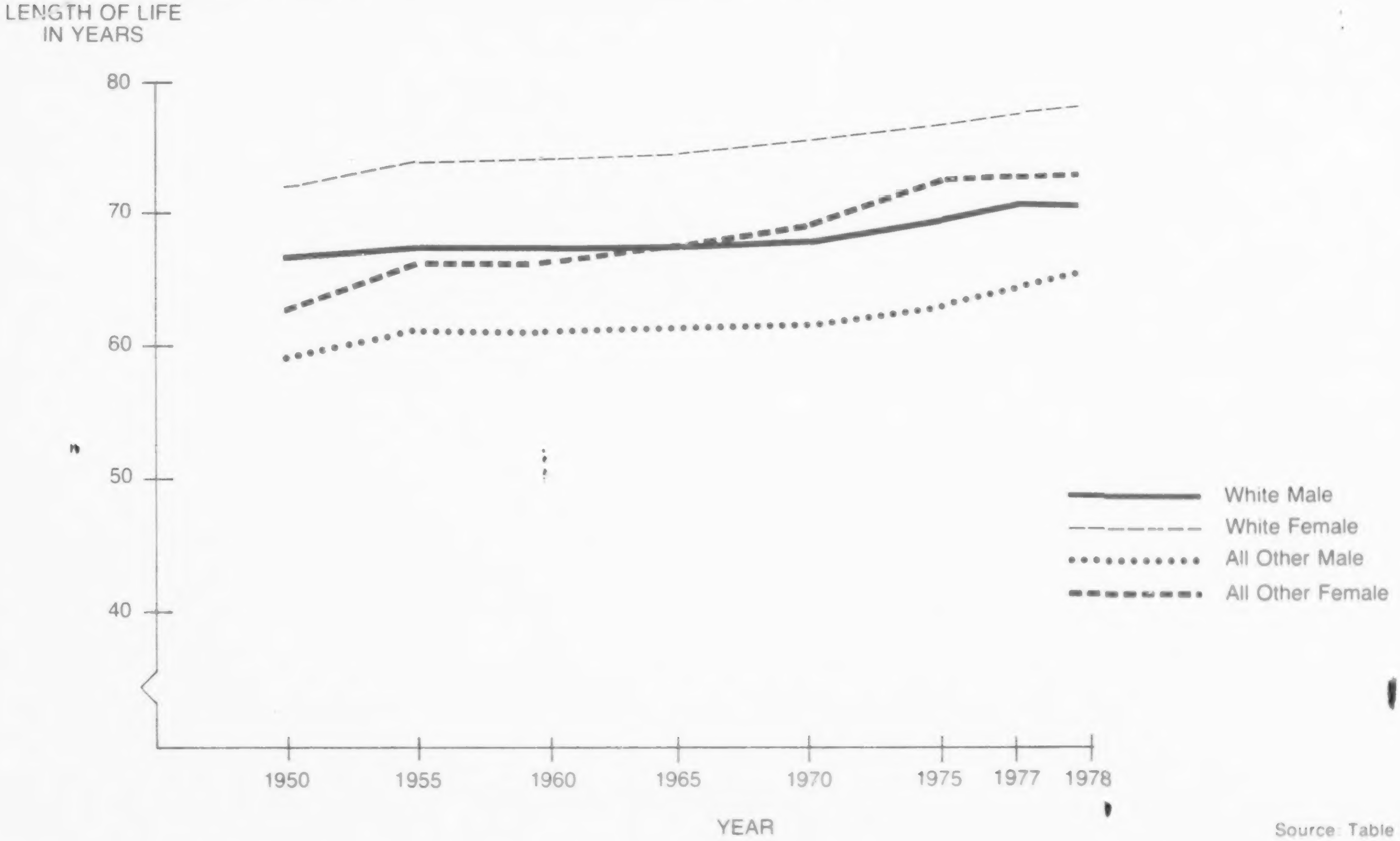
Source: U.S. Department of Commerce: Money Income of Families and Persons in the United States, 1978. Current Population Reports Series P-60, No. 123, June 1980:16-17.

Table 5—Estimated Average Length of Life in Years, by Color and Sex, Selected Years 1950-1978

Year	Total			White			All Other		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
1950	68.2	65.6	71.1	69.1	66.5	72.2	60.8	59.1	62.9
1955	69.6	66.7	72.8	70.5	67.4	73.7	63.7	61.4	66.1
1960	69.7	66.6	73.1	70.6	67.4	74.1	63.6	61.1	66.3
1965	70.2	66.8	73.8	71.1	67.6	74.8	64.3	61.2	67.6
1966	70.2	66.7	73.9	71.1	67.5	74.8	64.2	60.9	67.6
1967	70.5	67.0	74.3	71.4	67.8	75.2	64.9	61.4	68.5
1968	70.2	66.6	74.1	71.1	67.5	75.0	64.1	60.4	67.9
1969	70.5	66.8	74.4	71.4	67.7	75.3	64.5	60.6	68.6
1970	70.8	67.1	74.7	71.7	68.0	75.6	65.3	61.3	69.4
1971	71.1	67.4	75.0	71.9	68.2	75.8	65.6	61.6	69.7
1972	71.1	67.4	75.0	72.0	68.2	75.9	65.6	61.4	69.9
1973	71.3	67.5	75.2	72.1	68.4	76.1	65.9	61.8	70.1
1974	71.9	68.1	75.8	72.7	68.9	76.6	67.0	62.9	71.3
1975	72.5	68.7	76.5	73.2	69.4	77.2	67.9	63.6	72.3
1976	72.8	69.0	76.7	73.5	69.7	77.3	68.4	64.2	72.7
1977	73.2	69.3	77.1	73.8	70.0	77.7	68.8	64.6	73.1
1978	73.3	69.5	77.2	74.0	70.2	77.8	69.2	65.0	73.6

Source: National Center for Health Statistics, U. S. Department of Health and Human Services: Life Tables. Vital Statistics of the United States, 1978 2: 16, 1980.

Figure 4—Estimated Average Length of Life in Years by Race and Sex, 1950-1978



Source: Table 5

Table 6—Average Expectation of Life in Years at Specified Ages, by Color and Sex, Selected Years 1939-1978

Race and Year	Male At Birth	Male Age 20	Male Age 40	Male Age 50	Male Age 65	Female At Birth	Female Age 20	Female Age 40	Female Age 50	Female Age 65
White										
1939-1941	62.8	47.8	30.0	22.0	12.1	67.3	51.4	33.3	24.7	13.6
1949-1951	66.3	49.5	31.2	22.8	12.8	72.0	54.6	35.6	26.8	15.0
1959-1961	67.6	50.3	31.7	23.2	13.0	74.2	56.3	37.1	28.1	15.9
1969-1971	67.9	50.2	31.9	23.3	13.0	75.5	57.2	38.1	29.1	16.9
1975	69.4	51.4	33.0	24.3	13.7	77.2	58.6	39.4	30.3	18.1
1978	70.2	52.0	33.6	24.8	14.0	77.8	59.1	39.9	30.7	18.4
All other										
1939-1941	52.3	39.7	25.2	19.2	12.2	55.5	42.1	27.3	21.0	14.0
1949-1951	58.9	43.7	27.3	20.3	12.8	62.7	46.8	29.8	22.7	14.5
1959-1961	61.5	45.8	28.7	21.3	12.8	66.5	50.1	32.2	24.3	15.1
1969-1971	61.0	44.4	28.3	21.2	12.9	69.1	51.9	33.9	26.0	16.0
1975	63.6	46.3	29.8	22.4	13.7	72.3	54.7	36.2	27.9	17.5
1978	65.0	47.4	30.4	22.8	14.1	73.6	55.6	37.0	28.5	18.0

Source: U.S. Bureau of the Census: Statistical Abstract of the United States, 1980. Government Printing Office: 72, 1980.

Table 7—Estimated Death Rates by Age, Color, and Sex, 1979

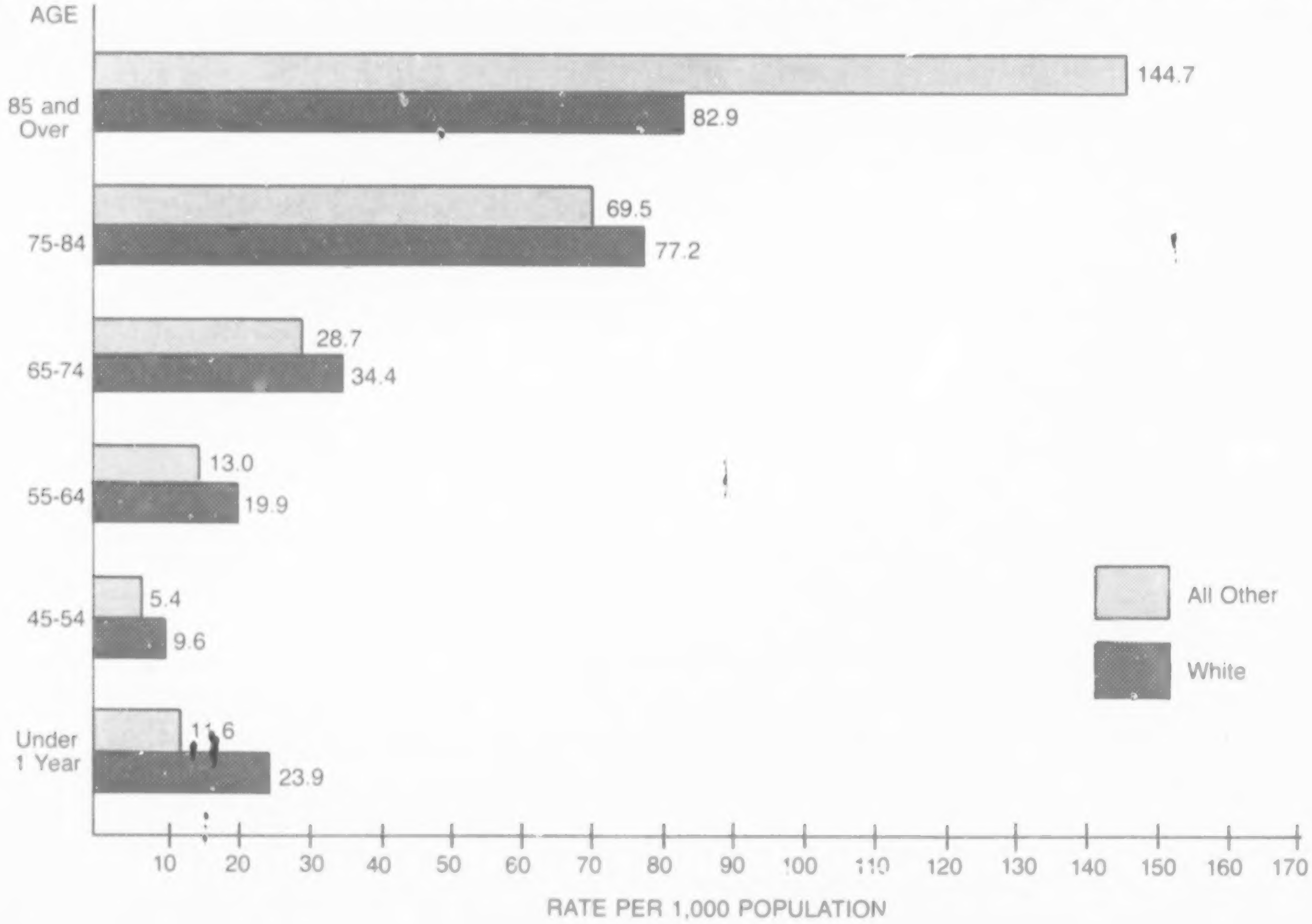
	Total			White			All Other		
Age (years)	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
All ages[a]	866.2	974.7	763.4	879.3	980.0	783.4	783.2	940.5	640.3
Under 1	1,372.5	1,552.4	1,184.3	1,160.1	1,330.0	981.1	2,388.4	2,622.8	2,146.4
1 to 4	62.7	67.8	57.2	57.2	60.8	53.4	87.3	100.1	74.3
5 to 14	34.8	44.2	25.0	33.9	43.5	23.9	39.2	47.7	30.6
15 to 24	118.2	179.9	55.7	115.4	176.1	53.2	134.2	201.5	69.2
25 to 34	139.1	204.6	75.2	120.0	174.2	65.6	263.8	418.5	132.5
35 to 44	227.9	303.4	156.5	198.4	259.8	138.8	433.1	633.7	269.2
45 to 54	588.5	767.1	420.5	538.8	705.8	379.5	958.3	1,244.7	710.6
55 to 64	1,371.1	1,855.6	936.4	1,303.3	1,768.5	883.0	1,988.9	2,671.5	1,407.8
65 to 74	2,921.9	4,018.2	2,078.1	2,865.1	3,975.4	2,012.6	3,435.5	4,400.6	2,676.9
75 to 84	7,014.0	9,127.3	5,739.3	6,953.1	9,127.5	5,662.2	7,716.0	9,125.0	6,682.0
85 and over	13,831.0	16,077.8	12,829.4	14,474.9	16,965.5	13,374.6	8,291.7	9,265.1	7,777.1

Note: Based on a 10 percent sample of deaths. Rates per 100,000 population in specified group.

[a] Figures for age not stated included in "All ages" but not distributed among age groups.

Source: U. S. Department of Health and Human Services: Annual Summary for the United States, 1979. Monthly Vital Statistics Report 28, No. 13: 20-21, November 13, 1980.

Figure 5—Death Rates per 1,000 Population for Selected Age Groups by Color, 1979



Source: Table 7

Infant and Maternal Mortality in the United States

The U.S. infant mortality rate is regarded as a key indicator of the level of health of the population, and by implication, as a measure of the effectiveness of the nation's health care delivery system. The following data summarize the United States infant and maternal mortality experience:

- The 1979 estimated infant mortality rate for the U.S. was 13.0 per 1,000 live births. This represents a 55.5 percent decrease from 1950 when the rate was 29.2 per 1,000 live births. It also represents a 19.3 percent decrease from 1975 when the rate was 16.1 per 1,000 live births.

- The infant mortality rate for the white population in 1977 was substantially lower (12.3 per 1,000 live births) than for other races (21.7 per 1,000 live births).

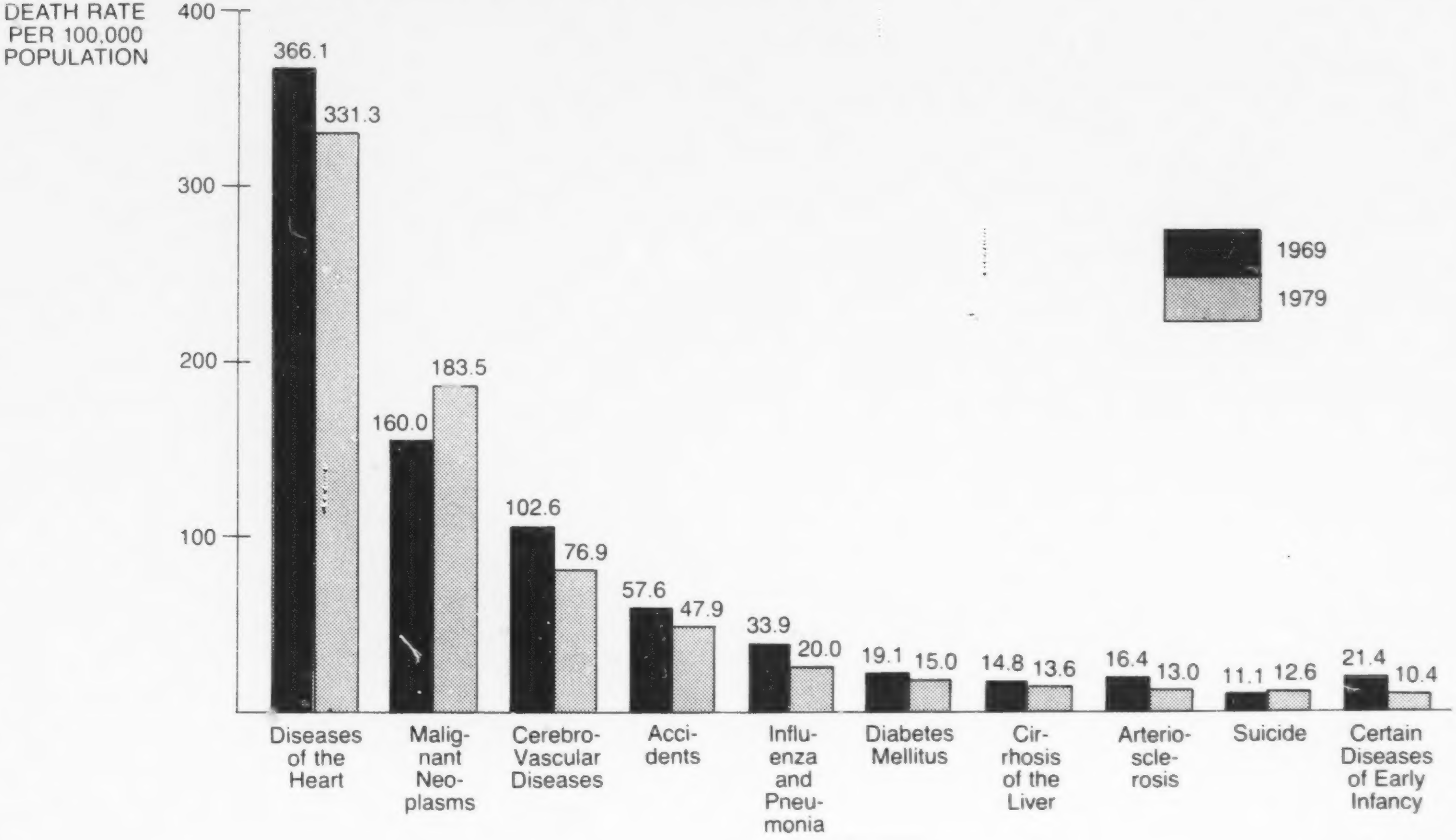
- The South Atlantic and East South Central Census Divisions had the highest infant mortality rates in the country in 1979 (14.9 and 14.6 per 1,000 live births), while the New England and Pacific Divisions had the lowest (10.8 and 11.2 per 1,000 live births, respectively).

- In 1979 Vermont had the lowest infant mortality rate (7.7 per 1,000 live births), while the District of Columbia had the highest rate (19.3 per 1,000 live births).

- The maternal mortality rate decreased from 22.2 per 100,000 live births in 1969 to 12.3 per 100,000 live births in 1976.

- The maternal mortality rate for white females in 1976 was 9.0 per 100,000 live births, whereas the rate for females of all other races was 26.5 per 100,000 live births.

Figure 6—Estimated Death Rates per 100,000 Population for the Leading Causes of Death, 1969 and 1979



Source: Table 8

Table 8—Death Rates for the 15 Leading Causes of Death, 1969, 1978, and 1979

	1969			1978			1979		
Cause of Death	Rank	Death Rate	% Total of Deaths	Rank	Death Rate	% Total of Deaths	Rank	Death Rate	% Total of Deaths
All causes		951.9	100.0%		883.4	100.0%		866.2	100.0%
Diseases of heart	1	366.1	38.4	1	334.3	37.8	1	331.3	38.3
Malignant neoplasms	2	160.0	16.8	2	181.9	20.6	2	183.5	21.2
Cerebrovascular diseases	3	102.6	10.7	3	80.5	9.0	3	76.9	8.9
Accidents	4	57.6	6.1	4	48.4	5.6	4	47.9	5.5
Bronchitis, Emphysema, and asthma[a]	5	33.9	3.5	11	10.0	1.1	5	22.7	2.6
Influenza and pneumonia	7	19.1	2.0	5	26.7	3.0	6	20.0	2.0
Diabetes mellitus	10	14.8	1.5	6	15.5	1.7	7	15.0	1.7
Cirrhosis of Liver[a]	8	16.4	1.7	7	13.8	1.6	8	13.6	1.6
Arteriosclerosis	11	11.1	1.1	8	13.3	1.5	9	13.0	1.5
Suicide	6	21.4	2.2	9	12.5	1.4	10	12.6	1.5
Homicide	9	15.4	1.6	12	9.4	1.1	11	10.5	1.2
Certain causes of mortality in early infancy[a]	13	7.7	0.8	10	10.1	1.1	12	10.4	1.2
Congenital anomalies	12	8.4	0.9	13	5.9	0.7	13	7.3	0.8
Nephritis and nephrosis	14	4.7	0.5	14	4.1	0.4	14	6.1	0.7
Septicemia	15	1.5	0.2	15	3.6	0.4	15	3.8	0.4
All other causes	--	111.2	11.6	--	113.5	12.9	--	91.6	10.6

Note: For 1979, based on a 10-percent sample of deaths; for all other years, based on final data. Rates per 100,000 population. [a]This category was redefined in 1979. See Sources for details.

Source: U.S. Department of Health and Human Services: Annual Summary for the United States, 1978. Monthly Vital Statistics Report, 26:24-25, August 13, 1979; 29:4, September 17, 1980; Annual Summary for the United States, 1979, 28:4, November 13, 1980.

Table 9—Death Rates for the 10 Leading Causes of Death by Census Division, 1978

Census Division	Heart Dis. a	Malig. Neop. b	Vasc. Dis. c	Accidents d	Pneum. & Flu e	Diabetes f	Cirrh. of Liv. g	Arterioscler. h	Suicide i	Dis. of Infan. j
United States	334.3	181.9	80.5	48.4	26.7	15.5	13.8	13.3	12.5	10.1
New England	347.7	203.3	76.0	38.5	31.7	16.2	15.1	13.6	10.5	7.2
Middle Atlantic	398.4	208.9	74.1	35.5	28.2	18.9	17.3	12.3	9.8	9.4
East No. Central	351.2	179.9	79.8	43.2	24.5	17.1	12.9	14.7	11.7	10.3
West No. Central	351.7	184.3	93.9	51.3	33.7	15.0	9.4	17.4	11.1	10.0
South Atlantic	338.2	186.5	85.5	51.3	26.2	15.5	14.2	11.7	13.9	11.0
East So. Central	332.0	175.2	100.1	61.1	27.9	15.5	9.4	13.2	11.5	11.6
West So. Central	298.6	163.3	85.4	57.8	26.9	14.5	10.3	13.6	12.4	12.8
Mountain	232.6	135.9	57.6	65.0	23.6	12.0	12.7	11.4	17.3	9.7
Pacific	274.5	168.7	72.9	51.6	23.0	11.0	17.1	12.3	15.8	8.3

a-Diseases of Heart
b-Malignant neoplasms
c-Cerebrovascular diseases
d-Accidents
e-Pneumonia, flu
f-Diabetes mellitus
g-Cirrhosis of liver
h-Arteriosclerosis
i-Suicide
j-Early infancy diseases

Source: U.S. Bureau of Census: Statistical Abstract of the United States, 1980. Government Printing Office:79, 1980.

Table 10—Days of Disability per Person per Year, by Sex and Age, 1975 and 1979

	Days of Disability Per Person Per Year					
	Restricted Activity		Bed Disability		Work Loss	
Sex and Age	1975	1979	1975	1979	1975	1979
Both sexes -- all ages	17.9	19.0	6.6	6.7	5.2	5.0
Under 17 years	11.0	11.0	4.4	4.9	a	a
17 to 24 years	12.3	12.8	5.1	5.0	4.6	4.9
25 to 44 years	15.6	16.2	5.8	5.6	5.1	4.7
45 to 64 years	24.2	26.0	8.4	8.3	5.8	5.6
65 years and over	38.4	41.9	12.9	13.7	4.3	4.6
Male -- all ages	15.6	16.9	5.4	5.6	4.9	4.7
Under 17 years	10.9	10.8	4.2	4.5	a	a
17 to 24 years	10.2	11.7	3.4	4.0	4.4	4.9
25 to 44 years	13.0	13.7	4.3	4.0	4.7	4.1
45 to 64 years	22.0	24.0	7.1	7.3	5.5	5.5
65 years and over	34.3	38.2	12.2	12.7	5.1	4.9
Female -- all ages	20.0	21.1	7.6	7.8	5.7	5.4
Under 17 years	11.1	11.2	4.6	5.3	a	a
17 to 24 years	14.3	13.8	6.7	5.9	4.8	5.0
25 to 44 years	18.1	18.6	7.2	7.2	5.9	5.6
45 to 64 years	26.2	27.8	9.6	9.1	6.2	5.7
65 years and over	41.4	44.5	13.4	14.3	--	4.2

[a] Work loss reported only for currently employed persons aged 17 and over.

Source: U. S. Department of Health and Human Services (formerly Department of HEW): Current Estimates from the Health Interview Survey - United States, 1975, 1979, Vital and Health Statistics Series 10, No. 115:26, March 1977; No. 136:24, April 1981.

Table 11—Days of Restricted Activity and Bed Disability per Person per Year, by Age and Family Income, 1979

	Family Income						
Age	All Incomes	Less than $3,000	$3,000-$4,999	$5,000-$6,999	$7,000-$9,999	$10,000-$14,999	$15,000-or more
	Days of restricted activity per person per year						
All Ages	19.1	39.8	35.7	31.0	23.6	17.4	13.6
Under 6 years	12.5	12.8	14.1	16.2	15.1	10.6	11.9
6 - 16 years	10.5	16.1	10.8	12.4	13.1	9.8	9.9
17 - 24 years	12.8	20.6	16.6	16.3	13.4	14.1	10.1
25 - 44 years	16.2	35.3	30.5	29.2	21.4	16.0	13.2
45 - 64 year	26.4	71.6	64.9	47.3	35.2	27.1	17.2
65 years and over	42.7	66.7	51.6	47.3	37.9	30.2	32.4
	Days of bed disability per person per year						
All Ages	6.7	13.4	12.3	10.1	8.6	6.4	4.8
Under 6 years	5.9	6.3	6.4	7.6	8.2	4.6	5.6
6 - 16 years	4.5	6.7	4.2	5.6	5.8	4.3	4.1
17 - 24 years	5.1	7.0	7.0	6.3	5.3	5.8	4.0
25 - 44 years	5.6	13.5	9.8	11.7	8.5	5.8	4.2
45 - 64 years	8.4	23.8	22.2	12.9	11.5	9.4	5.2
65 years and over	13.5	20.0	17.1	13.1	11.8	9.1	12.4

Source: Unpublished data from the National Health Interview Survey, National Center for Health Statistics, U. S. Department of Health and Human Services.

Characteristics of the Health Services Delivery System

The supply of health services--both personnel and facilities--must be considered in any evaluation of health programs affecting the demand for and utilization of health services.

As demand has grown, the health care industry has expanded. It has now become the third largest employer in the U.S. economy. Despite such widespread expansion, however, few people would argue that the present distribution of health resources approximates an ideal situation.

Adequate description of the health care delivery system requires developing a statistical profile of all providers of care and the patterns of utilization of their services. The following represent the highlights of the characteristics of the health services delivery system:

- As of December 31, 1979, there were 454,564 physicians in the U.S. and its possessions; of these, 28,338 were inactive.
- In 1979, 78.5 percent of all physicians were in patient-care activities; of these, 70.0 percent were office-based.
- In 1979, there were 206 physicians per 100,000 population compared to 144 in 1960.
- Data indicate that in 1978 there were an estimated 1,577,000 registered and practical nurses in the U.S.
- In 1978, the total number of active civilian dentists was 115.450. Active pharmacists numbered 136,670 in 1978.
- According to 1976 estimates, approximately 5,100,000 persons were employed in the health care field.
- A total of 6,988 hospitals with 1,372,000 beds were serving the U.S. population in 1979. Almost 60 percent (59.4 percent) of these hospitals were short-term general community hospi-tals with fewer than 200 beds.
- Total outpatient visits increased 44.4 percent between 1970 and 1979, from 181.4 million to 262.0 million.

- Adjusted expenses per inpatient day in community hospitals in 1979 were $215.75. This represents a 62.1 percent increase over 1975 and a 192.6 percent increase over 1970. When adjusted for general inflation, the increases were 20.2 percent from 1975 and 56.5 percent from 1970.

- The average number of physician visits per person per year was 4.7 in 1979 and 5.1 in 1975. Males made an average of 4.1 physician visits in 1979, and females made an average of 5.4 visits.

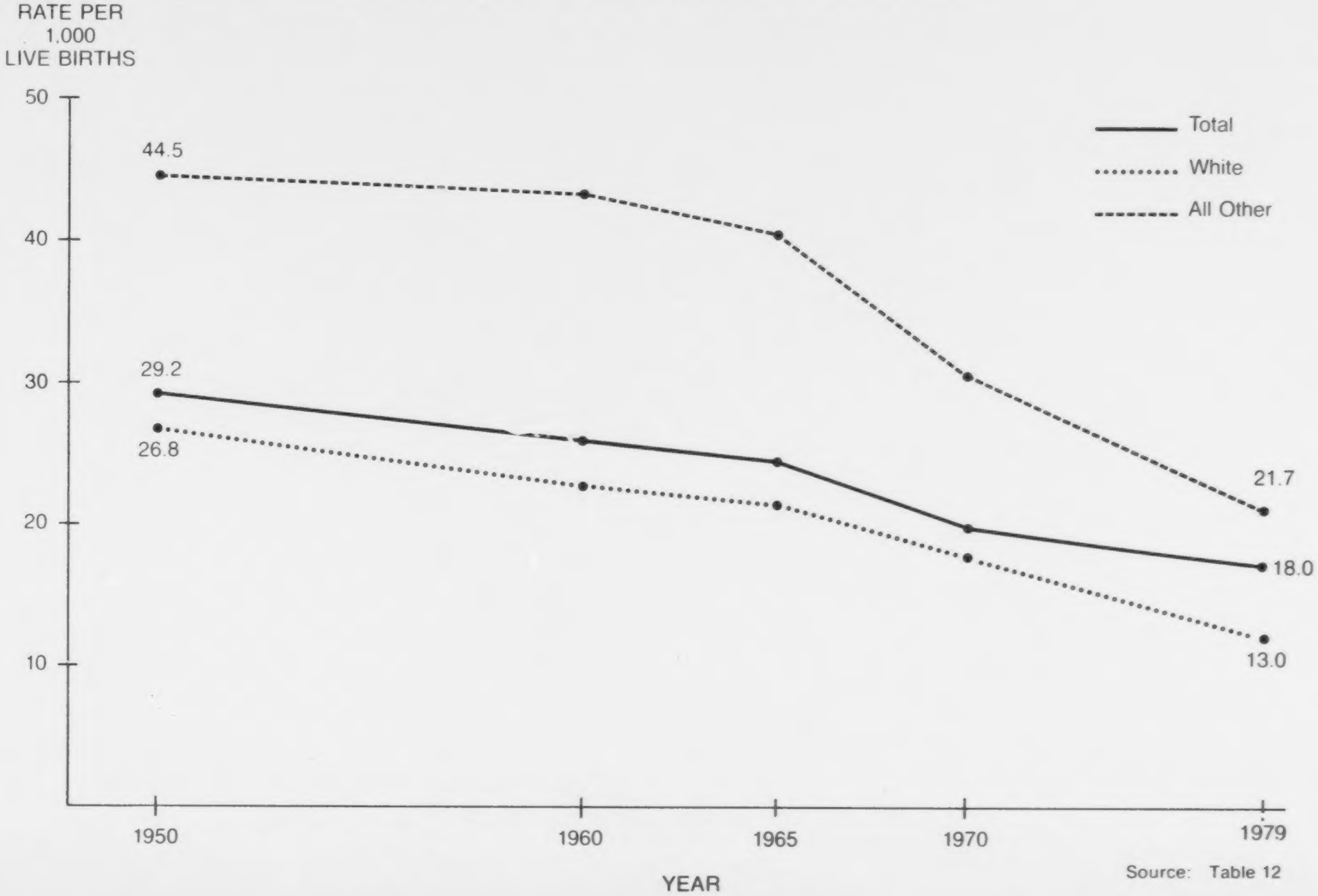
Table 12—Infant Mortality Rates by Age and Color, Selected Years 1950-1979

Year	Total			White			All Other		
	Under 1 Year	28 Days to 11 Months	Under 28 Days	Under 1 Year	28 Days to 11 Months	Under 28 Days	Under 1 Year	28 Days to 11 Months	Under 28 Days
1950	29.2	8.7	20.5	26.8	7.4	19.4	44.5	16.9	27.5
1960	26.0	7.3	18.7	22.9	5.7	17.2	43.2	16.4	26.9
1965	24.7	7.0	17.7	21.5	5.4	16.1	40.3	14.9	25.4
1967	22.4	5.9	16.5	19.7	4.7	15.0	35.9	12.1	23.8
1969	20.9	5.3	15.6	18.4	4.2	14.2	32.9	10.4	22.5
1970	20.0	4.9	15.1	17.8	4.0	13.8	30.9	9.5	21.4
1971	19.1	4.9	14.2	17.1	4.0	13.0	28.5	8.9	19.6
1972	18.5	4.8	13.6	16.4	4.0	12.4	27.7	8.5	19.2
1973	17.7	4.8	13.0	15.8	3.9	11.8	26.2	8.3	17.9
1974	16.7	4.4	12.3	14.8	3.7	11.1	24.9	7.7	17.2
1975	16.1	4.5	11.6	14.2	3.8	10.4	24.2	7.5	16.8
1976	15.2	4.3	10.9	13.3	3.6	9.7	23.5	7.2	16.3
1977	14.1	4.2	9.9	12.3	3.7	8.7	21.7	6.5	14.7
1978	13.8	4.3	9.5	NA	NA	NA	NA	NA	NA
1979	13.0	4.2	8.7	NA	NA	NA	NA	NA	NA

Note: For 1979, based on a 10-percent sample of deaths; for 1972, based on a 50-percent sample of deaths; for all other years based on final data. Rates per 1,000 live births in specified group.

Source: U. S. Department of Health and Human Services: Annual Summary for the United States. Monthly Vital Statistics Report 26:10, December 7, 1978; 28:6, November 13, 1980.

Figure 7—Infant Mortality Rates by Color, Selected Years 1950-1979



Source: Table 12

Table 13—Infant Mortality Rates by Region and State, 1970 and 1979

Region/State	Infant Mortality Rate 1970	Infant Mortality Rate 1979	Region/State	Infant Mortality Rate 1970	Infant Mortality Rate 1979	Region/State	Infant Mortality Rate 1970	Infant Mortality Rate 1979
New England	16.8	10.8	Missouri	19.1	14.8	West So. Central	21.7	12.7
Maine	17.2	9.6	North Dakota	14.1	12.6	Arkansas	20.4	12.6
New Hampshire	17.8	10.2	South Dakota	19.8	10.0	Louisiana	25.1	14.8
Vermont	17.1	7.7	Nebraska	17.3	11.7	Oklahoma	20.3	11.2
Massachusetts	16.4	10.5	Kansas	17.6	10.4	Texas	21.1	12.3
Rhode Island	18.7	15.2	South Atlantic	22.0	14.9	Mountain	19.0	12.1
Connecticut	16.5	11.3	Delaware	19.4	15.8	Montana	21.7	9.9
Middle Atlantic	19.8	14.2	Maryland	19.4	12.4	Idaho	16.3	7.9
New York	19.8	15.8	Dist. of Col.	27.0	19.3	Wyoming	18.9	8.9
New Jersey	19.0	11.9	Virginia	20.6	14.2	Colorado	20.3	11.3
Pennsylvania	20.1	13.3	West Virginia	22.8	13.6	New Mexico	21.1	13.5
East No. Central	19.5	12.9	North Carolina	23.9	15.3	Arizona	18.2	14.7
Ohio	18.4	12.0	South Carolina	22.6	17.2	Utah	15.3	12.7
Indiana	19.2	12.9	Georgia	21.4	14.1	Nevada	23.5	12.9
Illinois	21.4	15.2	Florida	21.7	15.0	Pacific	17.4	11.2
Michigan	20.1	13.5	East So. Central	23.0	14.6	Washington	18.9	10.9
Wisconsin	16.4	7.8	Kentucky	19.8	11.8	Oregon	16.9	11.1
West No. Central	17.9	11.9	Tennessee	21.3	15.1	California	17.1	11.1
Minnesota	16.8	10.9	Alabama	24.3	14.4	Alaska	22.1	15.4
Iowa	18.5	10.1	Mississippi	28.2	17.8	Hawaii	18.9	11.0

Note: Rates are deaths under 1 year per 1,000 live births.

Source: U. S. Department of Health and Human Services (formerly HEW): Annual Summary for the United States. Monthly Vital Statistics Report 19:14, September 21, 1971; 28:17, November 13, 1980.

Table 14—Infant Mortality Rates by Selected Causes, Selected Years 1970-1979

Cause of Death	1970	1975	1976	1977	1978	1979
All Causes	2,001.1	1,606.9	1,523.6	1,412.1	1,378.4	1,296.7
Certain gastrointestinal diseases	24.1	26.0	24.2	20.8	23.0	10.7
Pneumonia and influenza	168.9	70.0	61.9	50.6	46.0	33.1
Congenital anomalies	301.7	272.9	263.4	253.1	252.1	257.7
Disorders relating to short gestation and unspecified low birth weight	234.6	139.9	125.5	111.6	110.3	100.5
Birth trauma	64.2	55.3	57.2	53.9	57.4	31.7
Intrauterine hypoxia and birth asphyxia	252.9	128.8	113.6	98.3	88.7	48.4
Respiratory distress syndrome	119.5	123.3	119.7	107.8	99.7	155.8
Other conditions originating in the perinatal period	605.5[a]	521.5[a]	485.4[a]	438.3[a]	403.3[a]	317.3
Sudden infant death syndrome	--	133.0	137.5	142.8	148.9	142.8
All other causes	349.1[b]	392.4[b]	392.2[b]	385.5[b]	397.6[b]	199.0

Note: For 1979, based on a 10-percent sample of deaths; for all other years based on final data. Rates per 100,000 live births. Data are based on the Ninth Revision of the Interna-tional Classification of Diseases.

[a] Includes deaths for respiratory distress syndrome. [b] Includes deaths from sudden infant death syndrome.

Source: U.S. Department of Health and Human Services: Annual Summary for the United States. Monthly Vital Statistics Report 28:28, November 13, 1980.

Table 15—Maternal Mortality Rates by Age and Color, 1969, 1973, and 1976

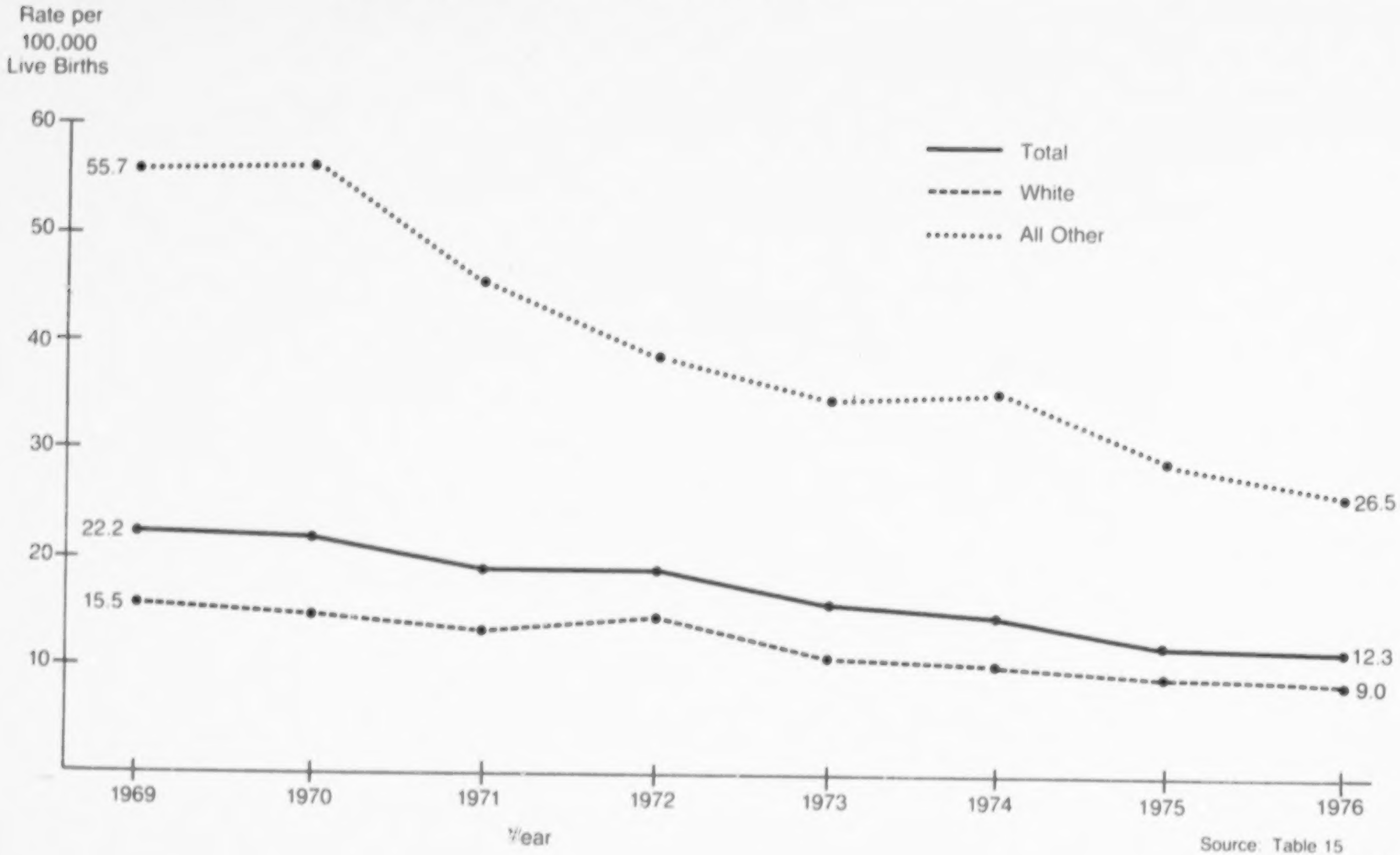
Age	1969			1973			1976		
	Total	White	All Other	Total	White	All Other	Total	White	All Other
Total	22.2	15.5	55.7	15.2	10.7	34.6	12.3	9.0	26.5
Under 20	17.7	10.0	36.7	12.6	6.5	26.7	6.8	4.8	11.6
20 - 24	13.1	9.9	31.3	9.3	7.3	18.2	9.0	7.1	17.2
25 - 29	17.0	13.0	45.9	13.1	10.6	29.8	11.0	7.9	30.0
30 - 34	34.9	23.3	100.1	26.2	17.5	74.2	17.9	11.7	52.1
35 - 39	69.6	47.8	173.9	44.2	27.2	117.5	45.8	30.0	111.4
40 - 44	119.3	78.7	298.7	78.5	55.3	167.6	65.6	63.1	74.5
45 and over[a]	176.5	73.2	600.6	154.5	66.9	447.4	346.5	281.4	530.5

Note: Maternal deaths are those assigned to complications of pregnancy, childbirth, and puerperium. Rates per 100,000 live births in specified group.

[a] Rates computed by relating deaths of women 45 years and over to live births to women 45-49 years.

Source: National Center for Health Statistics, U. S. Department of Health and Human Services (formerly HEW): Vital Statistics of the United States, Vol. II, Part A 1969 Sect. 1:50; 1973 Sect. 1:72; 1976 Sect. 1:73. Government Printing Office, 1974, 1977, 1980.

Figure 8—Maternal Mortality Rates by Color, 1969-1976



Source: Table 15
and prior issue

Table 16—Federal and Non-Federal Physicians by Activity, 1979

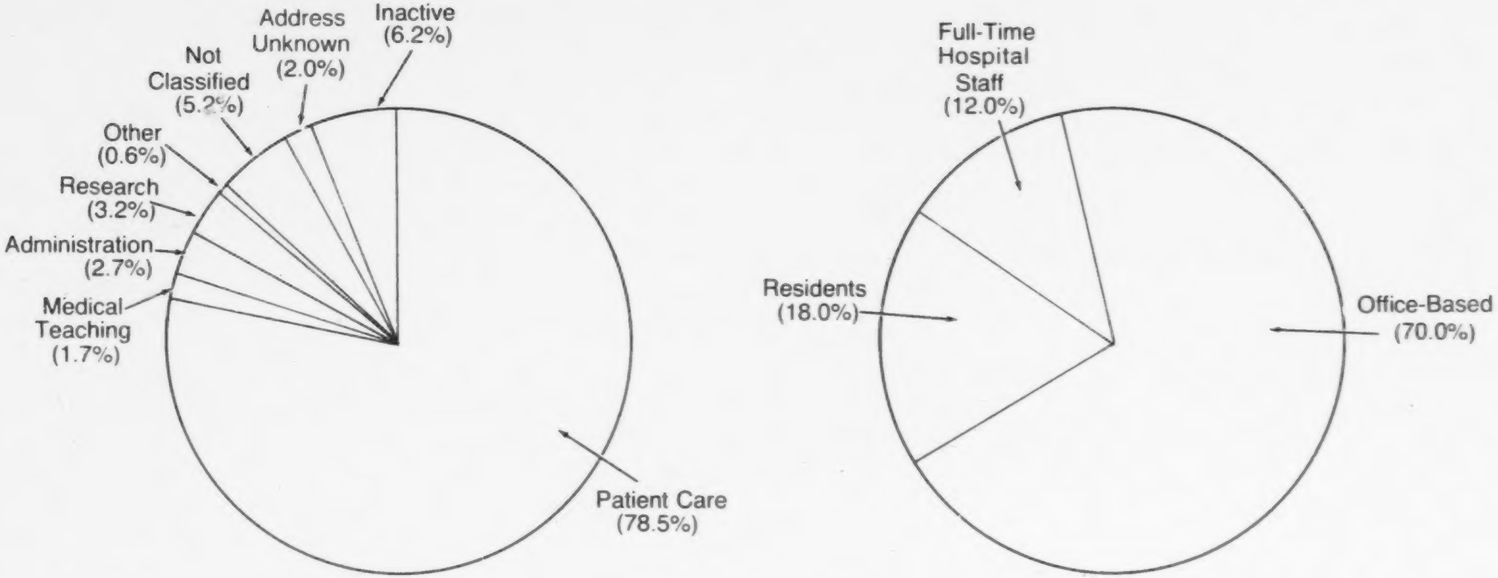
Activity	Total (100%)	Federal Number	Federal Percent	Nonfederal Number	Nonfederal Percent
Total Physicians	454,564[a]	18,531	4.1[b]	427,073	93.9[b]
Patient care	356,783	15,301	4.3	341,482	95.7
Office-based	249,585	654	.3	248,931	99.7
Hospital-based	107,198	14,647	13.7	92,551	86.3
Residents--all years	64,294	2,857	4.4	61,437	95.6
Full-time staff	42,904	11,790	27.5	31,114	72.5
Other professional activity	36,946	3,230	8.7	33,716	91.3
Medical teaching	7,523	532	7.1	6,991	92.9
Administration	12,118	1,413	11.7	10,705	88.3
Research	14,515	1,109	7.6	13,406	92.4
Other	2,790	176	6.3	2,614	93.7
Not classified	23,537	--	--	23,537	100.0
Inactive	28,338	--	--	28,338	100.0

[a] Includes 8,960 physicians with unknown addresses who are not distributed throughout table.

[b] 2.0% for the unknown addresses should be added to the sum of 4.1% and 93.9% to get 100%.

Source: Wunderman, L. E.: Physician Distribution and Medical Licensure in the U.S., 1979. Chicago: American Medical Association: 46, 48, 74, 1980.

Figure 9—Percentage Distribution of Total Physicians and Physicians in Patient Care by Activity, 1979



Total Physicians
(454,564)

Patient-Care Physicians
(356,783)

Source: Table 16

Table 17—Physicians, Population, and Physician/Population Ratios, Selected Years 1950-1979

Year	Total Physicians[a]	Total Population[b] (millions)	Physicians Per 100,000 Population	Population Per Physician	Nonfederal Physicians in Patient Care[c]	Civilian Population[b] (millions)	Nonfed. in Patient Care Per 100,000 Civ. Pop.	Civ. Pop. Per Nonfederal Physician in Pat. Care
1950	219,997	152.3	144	692	NA	150.8	NA	NA
1960	260,484	180.7	144	694	NA	178.1	NA	NA
1970	334,028	204.9	163	613	252,778	201.7	125	798
1971	344,823	207.1	167	601	261,335	204.3	128	782
1972	356,534	208.8	171	586	266,587	206.5	129	775
1973	366,379	210.4	174	574	270,412	208.1	130	770
1974	379,748	211.9	179	558	276,070	209.7	132	760
1975	393,742	213.6	184	542	285,345	211.4	135	741
1976	409,446	215.2	190	526	292,152	213.0	137	729
1977	421,278	216.9	194	515	312,872	214.7	146	686
1978	437,486	218.5	200	499	322,835	216.4	149	670
1979	454,564	220.6	206	485	338,328	218.5	155	646

[a] Includes inactive, not classified, and physicians whose addresses are unknown as of December 31.
[b] Total population includes Armed Forces and their dependents in the U. S. and abroad. Civilian population excludes this group and those in U. S. Possessions. As of July 1. [c] Excludes physicians in U. S. Possessions (Canal Zone, Pacific Islands, Puerto Rico, and Virgin Islands) as of December 31.

Source: U. S. Department of Commerce: Statistical Abstract of the U. S., 1980. Government Printing Office: 6, 1980.
U. S. Department of Health, Education, and Welfare: Health Manpower Source Book Section 20 PHS Pub. No. 263, Government Printing Office: 34, 1969.
Center for Health Services Research and Development: Physician Distribution and Medical Licensure in the U. S. Chicago: American Medical Association, Annual Volumes, 1965-1979.

Table 18—Registered Nurses and Practical Nurses in Relation to Population, Selected Years 1960-1978

Year	Resident Population[a] (thousands)	Registered Nurses: Number[b] (thousands)	Registered Nurses: Per 100,000 Population	Practical Nurses: Number[b] (thousands)	Practical Nurses: Per 100,000 Population
1960	178,729	504	282	206	115
1962	184,598	550	298	225	122
1964	190,169	582	306	250	131
1966	194,899	621	319	282	145
1968	199,017	667	335	320	161
1970	202,617	722	356	370	182
1971	205,056	750	366	400	195
1972	207,364	780	376	401	193
1973	209,118	815	390	423	202
1974	210,674	857	407	447	212
1975	212,318	906	427	468	220
1976	214,047	961	449	489	228
1978	217,391	1,059	487	518	238

Note: All numbers as of January 1.

[a] For 1975, 1976, and 1978, preliminary estimates. [b] Estimates.

Source: U. S. Department of Health, Education, and Welfare: Health Resources Statistics, 1976-77. Government Printing Office, 168, 177, 1978; Health Resources Statistics, 1978-79. Government Printing Office, forthcoming.

Table 19—Dentists in Relation to Population, Selected Years 1950-1978

Dentists and Population	1950	1960	1970	1976	1978
Total dentists	89,440	102,940	116,280	130,000	135,500
Total population (000s)[a]	153,620	182,290	206,070	215,869	219,484
Dentists per 100,000 population	58.2	56.5	56.4	60.2	61.7
Active dentists	76,940	90,040	102,220	115,000	120,620
Active civilian dentists	75,310	84,500	95,680	110,000	115,450
Resident civilian population (000s)[b]	151,240	179,740	203,110	213,860	217,389
Active civilian dentists per 100,000 civilians	49.8	47.0	47.1	51.4	53.1

Note: For 1978, data as of January 1. All other data as of December 31.

[a] Includes all persons in the United States and in the armed forces abroad.

[b] Excludes armed forces in the United States and abroad.

Source: U. S. Department of Health, Education, and Welfare: Health Resources Statistics, 1976-1977. Government Printing Office: 69, 1978; Health Resources Statistics, 1978-79. Government Printing Office, forthcoming.

Table 20—Pharmacists in Relation to Population, Selected Years 1950-1978

Year	Civilian Population (thousands)	Active Pharmacists	Active Pharmacists Per 100,000 Population
1950[a]	150,697	89,200	59.2
1960	179,323	96,200	53.6
1970	203,212	110,400	54.3
1975[b]	213,953	121,500	56.9
1978[c]	217,446	136,670	62.8

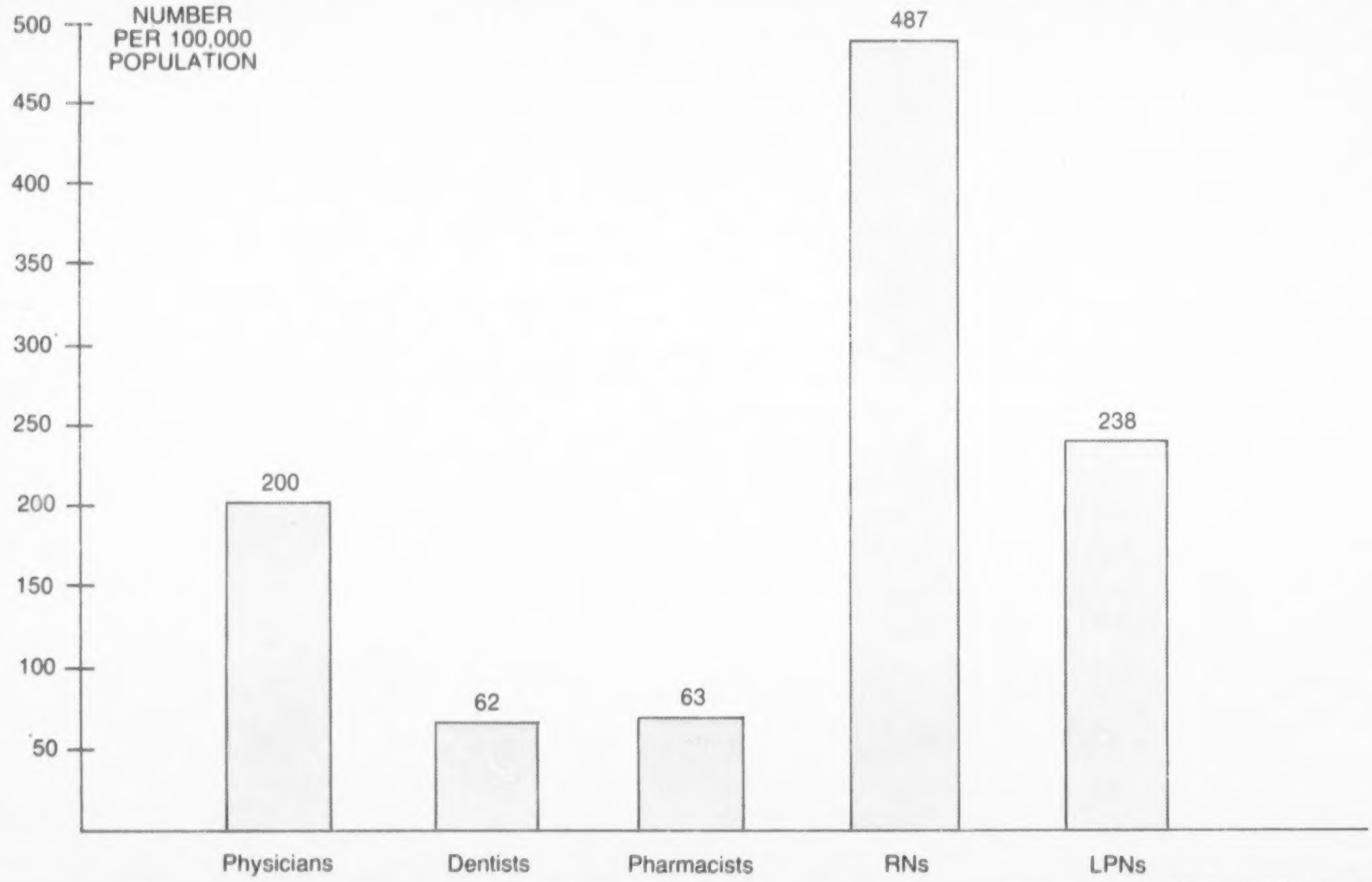
[a] Excludes data for Alaska and Hawaii.

[b] Excludes Puerto Rico and United States possessions. December 31 estimate.

[c] January 1 estimate.

Source: U.S. Department of Health, Education, and Welfare: Health Resources Statistics, 1976-77. Government Printing Office: 204, 1978; Health Resources Statistics, 1978-79. Government Printing Office, forthcoming.

Figure 10—Physicians, Dentists, Pharmacists, and Nurses per 100,000 Population, 1978



Source: Tables 17, 18, 19, and 20

Table 21—Estimated Number of Persons Employed in Selected Occupations Within the Health Care Field, 1976

Health Field	Number	Health Field	Number
Total[a]	5,080,500 to 5,118,400	Midwifery	4,350
Administration of health	48,200	Nursing & related services	2,489,600
Anthropology & sociology	1,900	Occupational therapy	17,000 to 18,000
Automatic data processing	4,300 to 5,400	Opticianry	12,000
Basic sciences[b]	65,000	Optometry	25,200 to 25,400
Biomedical engineering	13,000	Orthotic/prosthetic techn.	2,800 to 3,800
Chiropractic	18,200	Pharmacy	121,500
Clinical Laboratory Serv.	216,850	Physical therapy	32,100
Dentistry & allied serv.	321,600	Physician extender services	5,000
Dietetic & nutritional serv.	77,000	Podiatric medicine	7,100
Economic research	500	Psychology	71,000
Environmental sanitation	23,000 to 25,000	Radiologic technology	100,000
Food & drug services	51,100	Respiratory therapy	25,000
Funeral directors & embalmers	50,000	Secretarial/office services	275,000 to 300,000
Health & vital statistics	1,350	Social work	47,300
Health education	23,000	Special rehab. services	13,700
Health info. & commun.	8,400 to 10,500	Speech pathology/audiology	30,000
Library services	10,300	Veterinary medicine	36,000
Medical records	65,000	Vocational rehabilitation	18,000
Medicine (M.D. & D.O.)	393,700	Miscellaneous health services	355,450 to 360,950

[a] Each occupation is counted only once. For example, all physicians are in medicine and osteopathy.

[b] Statistics are not available on what percentage of the estimated 215,000 physician scientists are employed in the health field.

Source: U. S. Department of Health, Education, and Welfare: Health Resources Statistics, 1976-77. Government Printing Office: 10-12, 1978.

Table 22—Hospitals, Beds, Admissions, Average Daily Census, and Occupancy Rate by Type of Hospital, 1970 and 1979

Type of Hospital	Hospitals		Beds (thousands)		Admissions (thousands)		Average Daily Census (thousands)		Occupancy (Percent)	
	1970	1979	1970	1979	1970	1979	1970	1979	1970	1979
Total U. S.	7,123	6,988	1,616	1,372	31,759	37,802	1,298	1,043	80.3	76.1
Federal	408	361	166	117	1,741	1,986	128	92	79.6	78.2
Nonfederal	6,715	6,627	1,455	1,245	30,018	35,817	1,170	952	80.4	75.9
Psychiatric	519	527	527	224	598	567	447	187	84.8	83.2
Tuberculosis	101	12	20	2	36	8	12	1	61.8	61.8
Long-term general	236	165	60	40	132	81	49	35	82.0	86.1
Short-term general[a]	5,859	5,923	848	988	29,252	35,160	662	729	78.0	73.8
Community hospitals	NA	5,842	NA	984	NA	35,099	NA	727	NA	73.9
6-24 beds	397	269	7	5	241	161	4	2	55.7	45.8
25-49	1,327	1,055	48	38	1,655	1,254	30	20	63.6	52.5
50-99	1,490	1,448	105	104	3,669	3,584	74	65	70.7	62.6
100-199	1,275	1,378	177	195	6,414	7,017	134	135	75.8	69.4
200-299	592	718	141	173	5,148	6,512	114	132	80.3	76.2
300-399	356	401	121	136	4,348	5,061	99	106	82.3	78.2
400-499	190	251	83	111	2,915	4,077	70	89	84.3	80.0
500 or more	232	322	166	222	4,862	7,433	136	178	81.8	80.2

Note: Figures may not add due to rounding. [a]For 1979, includes data not classified by number of beds for institutions other than community hospitals.

Source: Hospitals Guide Issue 45:485, August 1 (part 2), 1971.

Hospital Statistics. Chicago: American Hospital Association:20, 1980.

Table 23—Total Outpatient Visits in 1970 and 1979 and Type of Outpatient Visits in 1979

	Total Outpatient Visits			1979 Outpatient Visits by Type of Visits	
Type of Hospital	1970	1979	% Change 1970-1979	Emergency	Other
Total U.S.	181,370,461	262,008,768	+ 44.5	81,244,699	180,764,069
Federal	42,912,742	51,238,616	+ 19.4	4,412,602	46,826,014
Nonfederal	138,457,719	210,770,152	+ 52.2	76,832,097	133,938,055
Psychiatric	2,739,743	5,613,904	+ 104.9	166,508	5,447,396
Tuberculosis	784,166	34,217	- 95.6	0	34,217
Long-term general	1,389,138	1,248,637	- 10.1	31,146	1,217,491
Short-term general[a]	133,544,672	203,873,394	+ 52.7	76,634,443	127,238,951
Community	NA	198,777,740	NA	76,328,177	122,449,563
6-24 beds	988,677	1,050,129	+ 6.2	270,286	779,843
25-49	6,328,810	6,188,637	- 2.2	2,424,674	3,763,963
50-99	10,756,382	17,258,331	+ 60.4	7,843,108	9,415,223
100-199	23,489,914	36,548,877	+ 55.6	15,990,524	20,558,353
200-299	23,901,985	34,298,258	+ 43.5	14,891,943	19,406,315
300-399	20,392,848	29,270,196	+ 43.5	11,301,577	17,968,619
400-499	14,600,633	24,441,576	+ 67.4	8,423,980	16,017,596
500 and over	33,085,423	49,721,736	+ 50.3	15,182,085	34,539,651

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[a] For 1979, includes data not classified by number of beds for institutions other than community hospitals.

Source: Hospitals Guide Issue 45:485, August 1 (part 2), 1971.

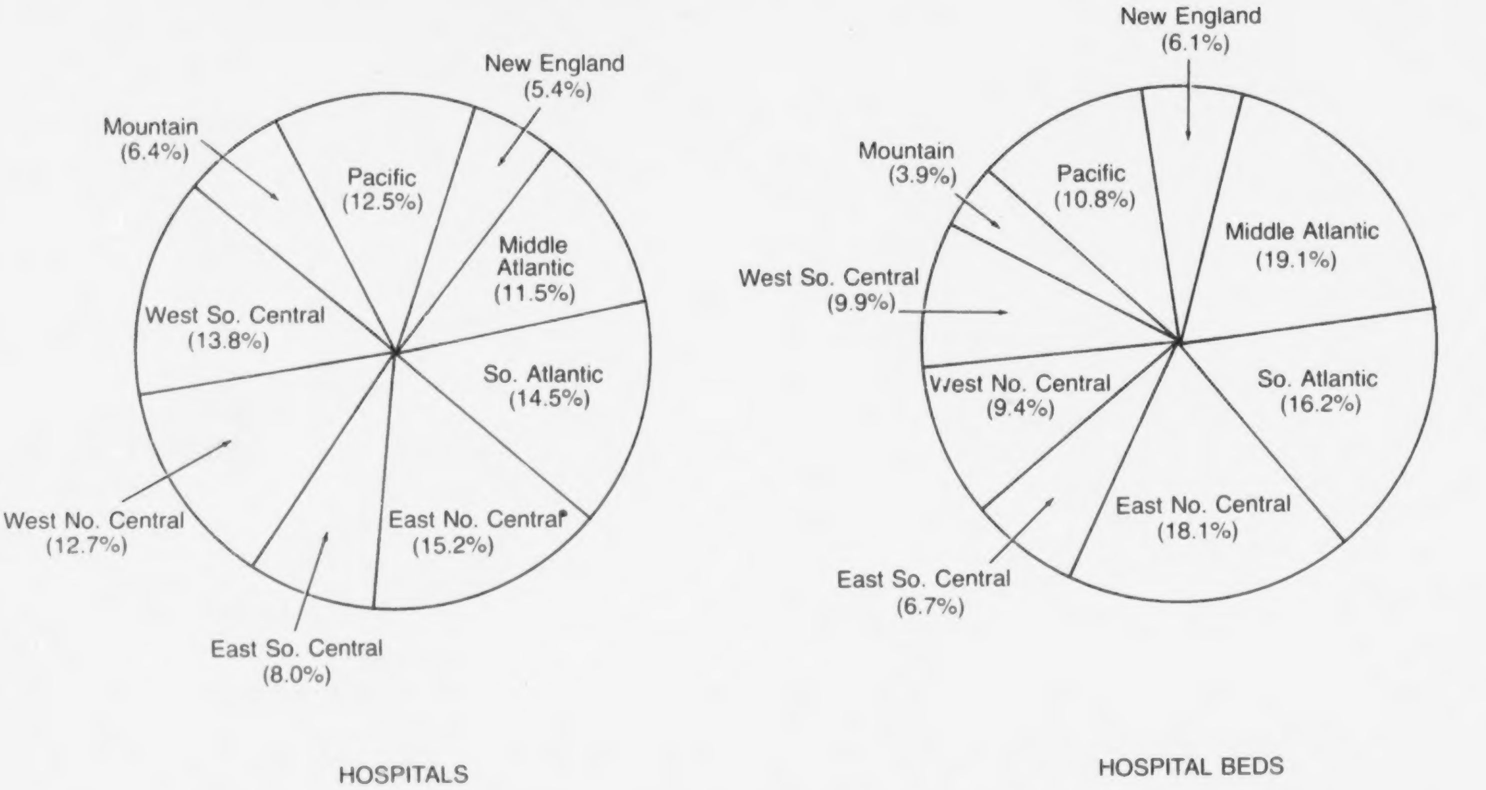
Hospital Statistics. Chicago: American Hospital Association:20, 1980.

Table 24—Hospitals, Beds, Admissions, Average Daily Census, and Occupancy Rate by Census Division, 1979

Census Divisions	Hospitals	Beds	Admissions	Average Daily Census	Occupancy Rate
United States -- Total	6,988	1,371,849	37,802,126	1,043,450	76.1
New England	377	83,770	1,945,897	67,094	80.1
Middle Atlantic	807	261,543	5,844,502	217,867	83.3
South Atlantic	1,016	221,751	6,167,065	168,906	76.2
East North Central	1,064	248,414	7,102,927	191,866	77.2
East South Central	561	91,780	2,911,446	70,128	76.4
West North Central	890	128,693	3,328,902	91,633	71.2
West South Central	964	135,553	4,281,620	95,811	70.7
Mountain	448	52,825	1,733,856	36,638	69.4
Pacific	871	147,520	4,485,911	103,507	70.2

Source: Hospital Statistics. Chicago: American Hospital Association: 20-39, 1980.

Figure 11—Percentage Distribution of Hospitals and Hospital Beds by Census Division, 1979



Source: Table 24

Table 25—Selected Utilization Measures in All U.S. Hospitals and In Community Hospitals, 1969, 1978, and 1979

	All U.S. Hospitals					Community Hospitals				
				Percent Change					Percent Change	
Measure	1969	1978	1979	1969-79	1978-79	1969	1978	1979	1969-79	1978-79
Hospitals	7,144	7,015	6,988	- 1.8	-0.4	5,853	5,851	5,842	-0.2	-0.2
Beds (000s)	1,650	1,381	1,372	-16.3	-0.7	826	975	984	19.1	0.9
Average number of beds per hospital	231	197	196	-14.7	-0.5	141	167	168	19.1	0.6
Admissions (000s)	30,729	37,243	37,802	21.2	1.5	28,254	34,506	35,099	24.2	1.7
Average daily census (000s)	1,346	1,042	1,043	-22.5	0.1	651	718	727	11.7	1.3
Average length of stay, days	NA	NA	NA	--	--	8.3	7.6	7.6	-8.4	--
Occupancy, percent	81.6	75.5	76.1	- 6.7	-0.8	78.8	73.6	73.9	-6.6	0.4
Outpatient visits (000s)	163,248	263,606	262,009	60.5	-0.6	120,831[a]	201,931	198,778	64.5	-1.6

NA - Comparable data not available.

[a] Based only on hospitals reporting outpatient visits.

Source: Hospital Statistics. Chicago: American Hospital Association:xii, 4, 1980.

Table 26—Total Expenses and Expenses per Patient Day for Non-Federal Short-Term General Hospitals, Selected Years 1950-1979

Year	Total Expenses (in millions)	Annualized Percentage Increase	Expenses Per Inpatient Day	Annualized Percentage Increase	Adjusted Expenses Per Inpatient Day[a]	Annualized Percentage Increase	Real Adjusted Expenses Per Inpatient Day[b]
1950	$ 2,120	--	$ 15.62	--	NA	--	--
1955	3,434	10.1%	23.12	8.2%	NA	--	--
1960	5,617	10.3	32.23	6.9	NA	--	--
1965	9,147	10.2	44.48	6.7	40.56	--	42.92
1969	16,613	17.3	70.03	13.8	64.26	14.0	58.52
1970	19,560	17.7	81.01	15.7	73.73	14.7	63.40
1971	22,400	14.5	92.31	13.9	83.43	13.2	68.78
1972	25,549	14.1	105.21	14.0	94.61	13.4	75.51
1973	28,496	11.5	114.69	9.0	101.78	7.6	76.47
1974	32,751	14.9	128.05	11.6	113.21	11.2	76.65
1975	39,110	19.4	151.42	18.3	133.08	17.6	82.56
1976	45,402	16.1	NA	NA	152.24	14.4	89.29
1977	51,832	14.2	NA	NA	173.25	13.8	95.45
1978	58,348	12.6	NA	NA	193.81	11.9	99.19
1979	66,184	13.4	NA	NA	215.75	11.3	99.24

[a] Costs incurred are adjusted to eliminate that portion expended for outpatient care. The 1976, 1977, and 1978 data include adjusted expenses only. [b] Adjusted expenses per inpatient day are deflated by the annual consumer price index (all items).

Source: Hospital Statistics. Chicago: American Hospital Association: 5, 1980.

National Health Care Expenditures

Recent economic experience has generated increasing concern about the trend in health care prices and in expenditures for health care services. These trends can be attributed to such factors as increased demand for health care, expanded health services, and general inflationary pressures. The following summarize this trend over the past several years.

- Health care expenditures in the U.S. reached an estimated $247.2 billion, or $1,067 per capita, in 1980. This amount represented 9.4 percent of the Gross National Product, compared to 7.5 percent ten years earlier.

- In 1980, hospital care expenditures of $99.6 billion, or $430 per capita, accounted for the largest component of total health care outlays (40.3 percent).

- Expenditures for physicians' services amounted to $46.6 billion, or $201 per capita, in 1980. This amount represented the second largest component of total health expenditures (18.9 percent).

- In the eleven-year period 1970-1980, per capita personal health care expenditures increased 201 percent, from $312 to $941.

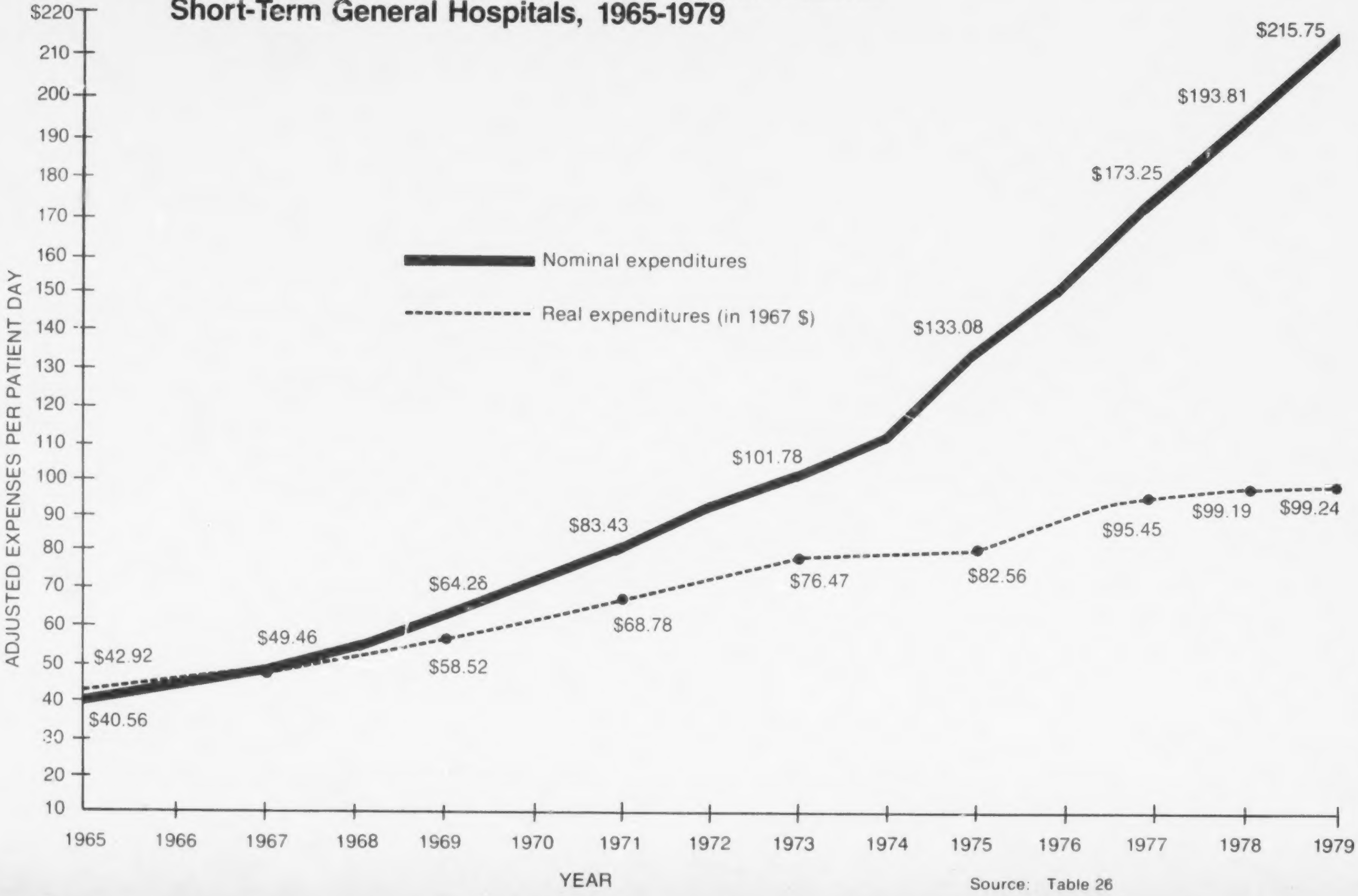
- Per capita personal health expenditures for persons 65 years of age and older were $2,026.19 in fiscal 1978. This amount was almost three times greater than the per capita expenditures for all age groups ($753).

- In fiscal year 1979, $428.4 billion were spent for public social welfare programs, an increase of 194 percent since 1970.

- The "all items" component of the CPI increased 13.5 percent between 1979 and 1980, compared to 11.3 percent the previous year. The medical care component of the CPI rose 10.9 percent, compared to 9.3 percent the previous year.

- The charge for physicians' services increased 10.6 percent between 1979 and 1980, compared to 9.2 percent the previous year. The charge for a semi-private hospital room rose 13.1 percent, compared 11.4 percent the previous year.

Figure 12—Adjusted Expenses per Patient Day for Non-Federal Short-Term General Hospitals, 1965-1979



Source: Table 26

Table 27—Utilization Trends in Community Hospitals, Selected Years 1950-1979

	Hospital Beds		Average Daily Census		Admissions During Year	
	Number (thousands)	Per 1,000 Population	Number (thousands)	Per 1,000 Population	Number (thousands)	Per 1,000 Population
1950	505	3.3	372	2.5	16,663	110.5
1955	568	3.5	407	2.5	19,100	117.2
1960	639	3.6	477	2.7	22,970	129.0
1965	741	3.9	563	2.9	26,463	138.1
1967	788	4.0	612	3.1	26,988	138.2
1969	826	4.1	651	3.3	28,254	141.9
1970	848	4.2	662	3.3	29,252	145.0
1971	867	4.2	665	3.3	30,142	147.5
1972	879	4.3	663	3.2	30,709	148.7
1973	898	4.3	680	3.3	31,671	152.2
1974	926	4.4	700	3.3	32,866	156.7
1975	942	4.5	706	3.3	33,435	158.2
1976	956	4.5	713	3.3	33,979	159.5
1977	969	4.5	715	3.3	34,273	159.6
1978	975	4.5	718	3.3	34,506	159.5
1979	984	4.5	727	3.3	35,099	160.6

Note: Before 1972, hospital data include information for hospital units of institutions. Population data refer to the civilian population.

Source: Hospital Statistics. Chicago: American Hospital Association: 5,7, 1980.
U. S. Bureau of the Census: Statistical Abstract of the United States, 1980. Government Printing Office: 6, 1980.

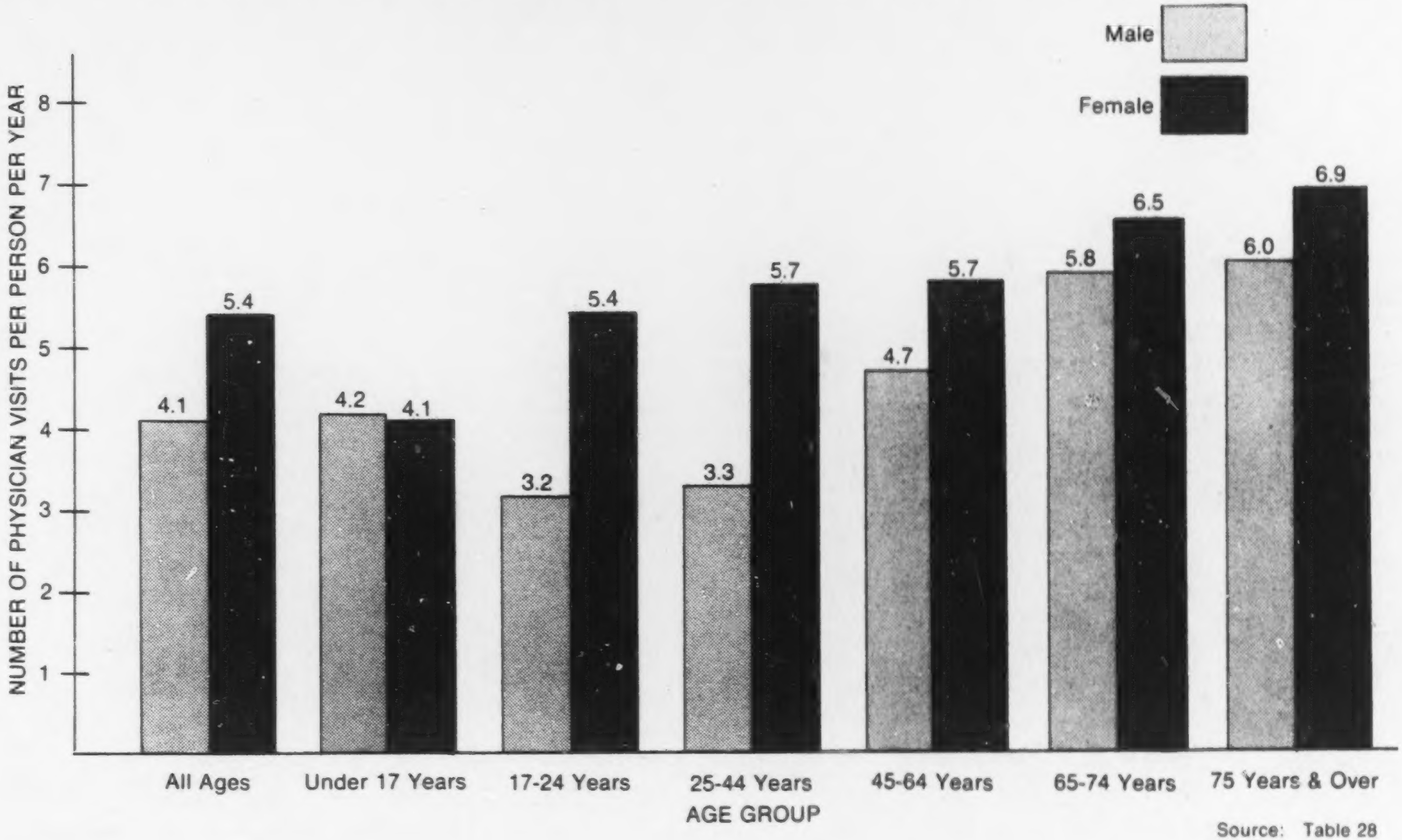
Table 28—Number of Physician Visits and Physician Visits per Person per Year, by Age and Sex, 1975 and 1979

	Physician Visits (thousands)						Visits Per Person Per Year					
	Both Sexes		Male		Female		Both Sexes		Male		Female	
Age (years)	1975	1979	1975	1979	1975	1979	1975	1979	1975	1979	1975	1979
All ages	1,056,094	1,021,986	435,256	421,832	620,838	600,154	5.1	4.7	4.3	4.1	5.7	5.4
Under 17	263,196	241,153	141,261	124,579	121,935	116,573	4.2	4.1	4.5	4.2	4.0	4.1
17-24	144,583	138,600	50,350	49,801	94,233	88,790	4.8	4.3	3.4	3.2	6.0	5.4
25-44	265,038	266,735	90,630	93,188	174,408	173,548	5.1	4.5	3.6	3.3	6.4	5.7
45-64	242,618	227,292	97,096	97,555	145,521	129,737	5.6	5.2	4.7	4.7	6.5	5.7
65-74	89,171	92,601	37,038	37,823	52,133	54,778	6.6	6.2	6.3	5.8	6.8	6.5
75 and over	51,487	55,606	18,880	18,878	32,607	36,728	6.6	6.6	6.5	6.0	6.7	6.9

Note: Data are based on household interviews of the civilian noninstitutionalized population.

Source: Current Estimates from the Health Interview Survey - United States, 1976, 1979. Vital and Health Statistics Series 10, No. 115:29, March 1977; No. 136:32, April 1981.

Figure 13—Number of Physician Visits per Person per Year, by Age and Sex, 1979



Source: Table 28

Table 29—Number of Nursing Homes and Nursing Home Beds, 1963, 1973, and 1976

Type of Nursing Care and Related Homes	Nursing Homes			Nursing Home Beds		
	1963	1973	1976	1963	1973	1976
Total Homes	16,701	21,834	20,185	568,560	1,327,704	1,406,778
Nursing care	8,128	14,873	13,312	319,224	1,107,358	1,173,519
Personal care homes with nursing	4,958	--	--	188,306	--	--
Personal care homes without nursing	2,927	6,961[a]	6,873[a]	48,962	220,346[a]	233,359[a]
Domiciliary care	688	--	--	12,068	--	--

[a] Includes personal care homes with nursing, personal care homes without nursing and domiciliary care homes.

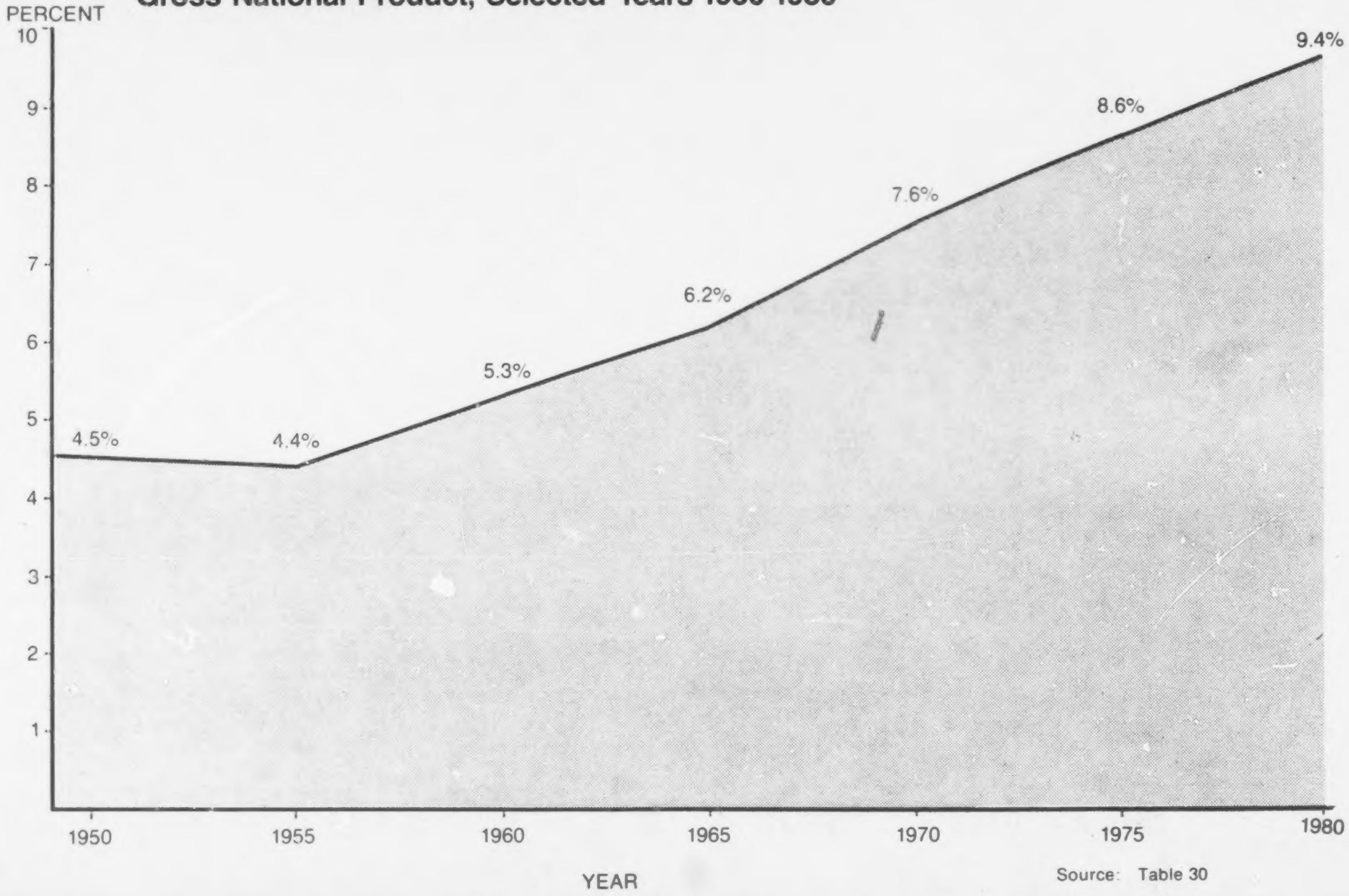
Source: U.S. Department of Health, Education, and Welfare: Health Resources Statistics, 1975. Government Printing Office: 365, 1976; Health Resources Statistics, 1976-77. Government Printing Office: 329, 1978.

Table 30—Aggregate and Per Capita National Health Expenditures, by Percent of Gross National Product, Selected Years 1929-1980

Year	Gross National Product (billions)	Health Expenditures (billions)	Percent of GNP	Per Capita
1929	$ 103.4	$ 3.6	3.5%	$ 29.49
1940	100.0	4.0	4.0	29.62
1950	286.5	12.7	4.4	81.86
1960	506.5	26.9	5.3	146.30
1965	691.0	41.7	6.0	210.89
1970	992.7	74.7	7.5	357.90
1971	1,077.6	83.3	7.7	394.23
1972	1,185.9	93.5	7.9	437.77
1973	1,320.4	103.2	7.8	478.34
1974	1,434.2	116.4	8.1	534.63
1975	1,549.2	132.7	8.6	603.57
1976	1,718.0	149.7	8.7	674.14
1977	1,918.0	169.2	8.8	754.81
1978	2,156.1	189.3	8.8	835.57
1979	2,413.9	214.6	8.9	936.92
1980	2,626.1	247.2	9.4	1,067.06

Source: Gibson, R. M. and Waldo, D. R.: National Health Expenditures, 1980. Health Care Financing Review 3:18-19, September 1981.

Figure 14—[illegible]tional Health Expenditures as a Percentage of Gross National Product, Selected Years 1950-1980



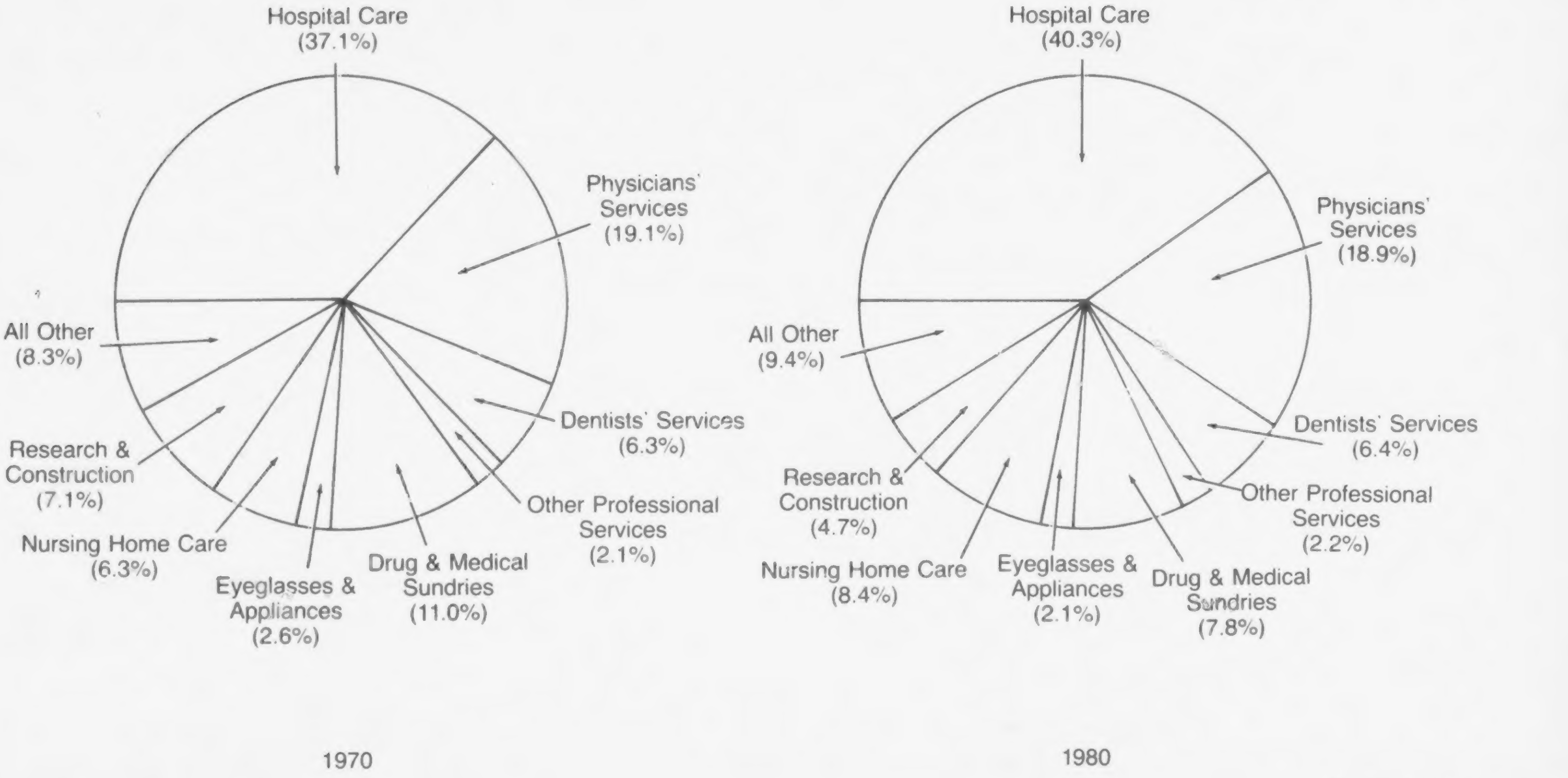
Source: Table 30

Table 31—National Health Expenditures by Type of Expenditure, 1970 and 1980

Type of Expenditure	1970 Amount (billions)	1970 Percent	1970 Per Capita	1980 Amount (billions)	1980 Percent	1980 Per Capita
Total Expenditures	$74.7	100.0%	$357.90	$247.2	100.0%	$1,067.06
Health services and supplies	69.3	92.8	332.02	235.6	95.3	1,017.10
Personal health care	65.1	87.3	312.29	217.9	88.2	940.62
Hospital care	27.8	37.2	133.05	99.6	40.3	429.80
Physicians' services	14.3	19.2	68.74	46.6	18.9	201.18
Dentists' services	4.7	6.4	22.77	15.9	6.4	68.42
Other professional services	1.6	2.1	7.64	5.4	2.2	23.30
Drugs and medical sundries	8.0	10.7	38.33	19.2	7.8	83.00
Eyeglasses and appliances	1.9	2.6	9.33	5.1	2.1	22.10
Nursinghome care	4.7	6.3	22.52	20.7	8.4	89.46
Other health services	2.1	2.8	9.92	5.4	2.2	23.34
Expenses for prepayment and administration	2.7	3.6	12.92	10.4	4.2	44.93
Government public health activities	1.4	1.9	6.81	7.3	3.0	31.55
Research & construction of medical facilities	5.4	7.2	25.88	11.6	4.7	49.96
Research	2.0	2.6	9.44	5.4	2.2	23.50
Construction	3.4	4.6	16.45	6.1	2.5	26.46

Source: Gibson, R. M. and Waldo, D. R.: National Health Expenditures, 1980. *Health Care Financing Review* 3:32-33, September 1981.

Figure 15—Percentage Distribution of Total National Health Expenditures by Type of Expenditure, 1970 and 1980



Source: Table 31

Table 32—Aggregate, Per Capita, and Percentage Distribution of Personal Health Care Expenditures by Type of Expenditure, Selected Years 1950-1980

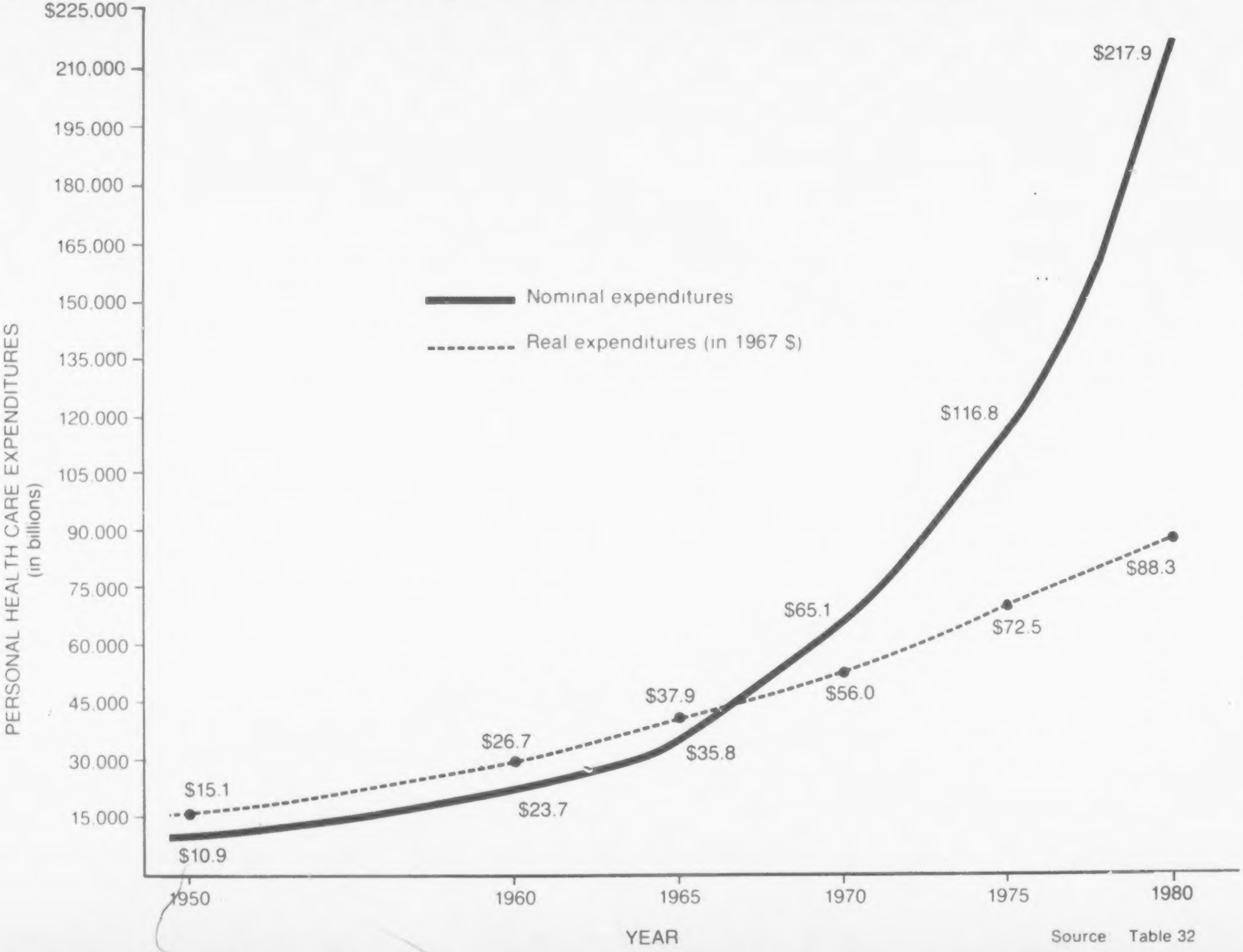
	Total--All Personal Health Care Services			Hospital Care			Physicians' Services			All Other Personal Health Care Services[a]		
Year	Total[b]	Per Capita	Per-cent	Total[b]	Per Capita	Per-cent	Total[b]	Per Capita	Per-cent	Total[b]	Per Capita	Per-cent
1950	$ 10.9	$ 70.37	100.0%	$ 3.9	$ 24.90	35.4%	$ 2.7	$ 17.76	25.2%	$ 4.3	$ 27.71	39.4%
1960	23.7	128.81	100.0	9.1	49.46	38.4	5.7	30.92	24.0	9.0	48.33	37.5
1965	35.8	180.73	100.0	13.9	70.13	38.8	8.5	42.82	23.7	13.4	67.78	37.5
1970	65.1	312.29	100.0	27.8	133.05	42.6	14.3	68.74	22.0	23.0	110.51	35.4
1971	72.0	340.64	100.0	30.8	145.87	42.8	15.9	75.35	22.1	25.2	119.41	35.1
1972	80.2	375.53	100.0	34.9	163.59	43.6	17.2	80.36	21.4	28.1	131.58	35.1
1973	88.7	411.20	100.0	38.7	179.36	43.6	19.1	88.45	21.5	30.9	143.39	34.9
1974	101.0	463.84	100.0	44.8	205.71	44.4	21.2	97.60	21.0	35.0	160.54	34.6
1975	116.8	530.97	100.0	52.1	236.97	44.6	24.9	113.38	21.4	39.7	180.62	34.0
1976	131.8	593.67	100.0	59.9	269.77	45.4	27.6	124.17	20.9	44.2	199.72	33.6
1977	148.7	663.16	100.0	67.8	302.20	45.6	31.9	142.05	21.4	49.2	218.90	33.0
1978	166.7	735.57	100.0	75.7	334.09	45.4	35.8	158.03	21.5	55.1	243.45	33.1
1979	189.1	825.68	100.0	85.7	373.98	45.3	40.7	177.65	21.5	62.8	274.05	33.2
1980	217.9	940.62	100.0	99.6	429.80	45.7	46.6	201.18	21.4	71.7	309.62	32.9

Note: Includes all expenditures for health services and supplies other than expenses for prepayment and administration and government public health activities.

[a] Includes dentists' services, other professional services, drugs and medical sundries, eyeglasses and appliances, nursing-home care, and other health services. [b] In billions.

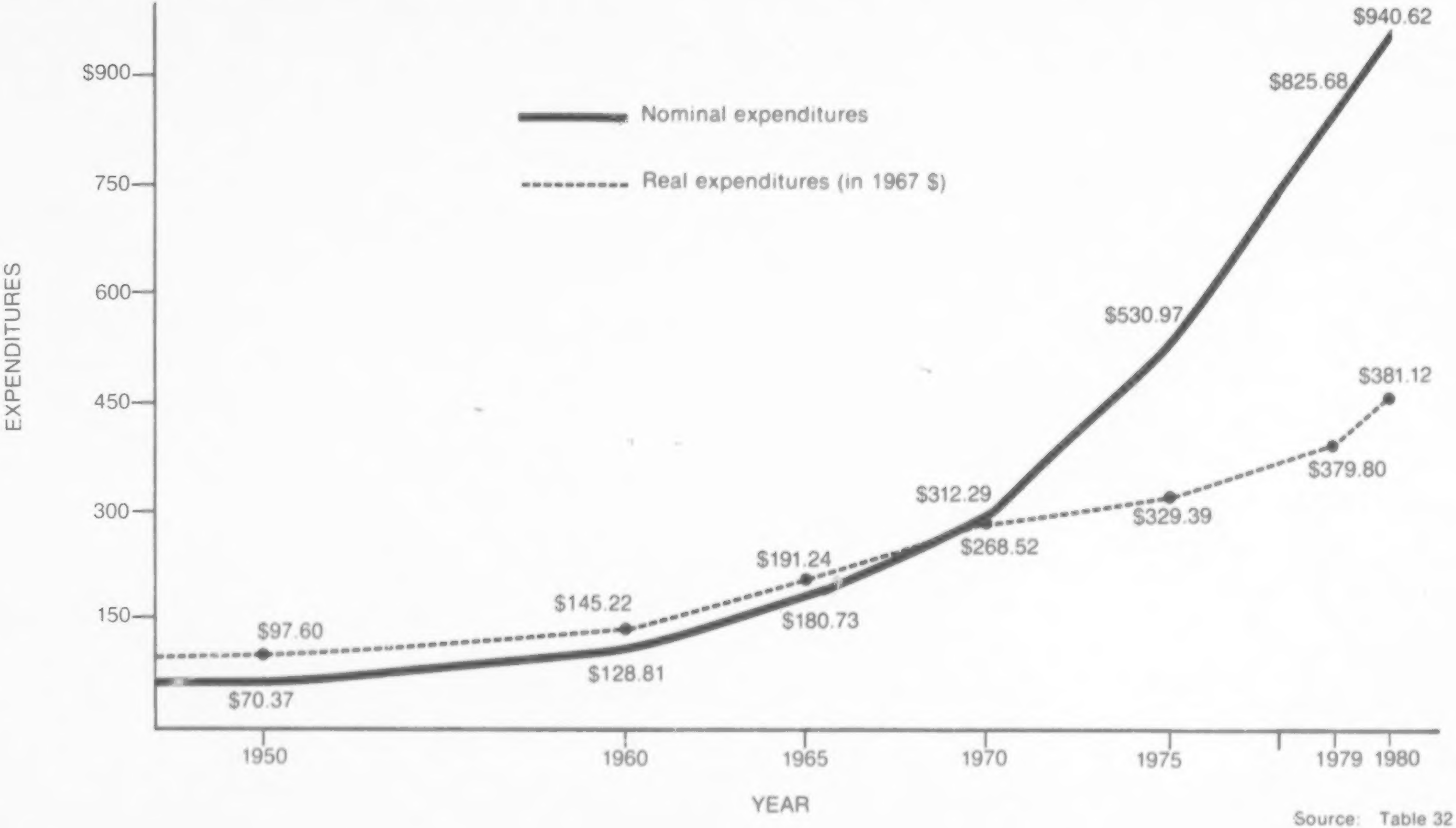
Source: Gibson, R. M. and Waldo, D. R.: National Health Expenditures, 1980. Health Care Financing Review 3: 32-35, September 1981.

Figure 16—Personal Health Care Expenditures, Selected Years 1950-1980



Source: Table 32

Figure 17—Per Capita Personal Health Care Expenditures, Selected Years 1950-1980



Source: Table 32

Table 33—Estimated Total and Per Capita Personal Health Expenditures for Three Age Groups by Type of Expenditure, 1975 and 1978

Type of Expenditure	All Ages		Under 19		19-64		65 and Over	
	Total[a]	Per Capita	Total[a]	Per Capita	Total[a]	Per Capita	Total[a]	Per Capita
Total Expenditures--1975[b]	$110,665	$509.90	$14,393	$196.10	$65,006	$536.54	$31,266	$1,391.08
Hospital care	49,973	230.25	5,007	68.22	31,238	257.83	13,728	610.78
Physicians' services	24,553	113.13	3,928	53.52	15,523	128.12	5,103	227.02
Dentists' services	8,034	37.02	1,788	24.36	5,455	45.02	792	35.23
Other professional services	2,463	11.35	248	3.38	1,595	13.16	621	27.61
Drugs and drug sundries	10,582	48.76	1,843	25.11	6,619	54.63	2,119	94.28
Eyeglasses and appliances	1,822	8.40	247	3.37	1,308	10.80	267	11.88
Nursing-home care	9,620	44.33	190	2.59	1,131	9.33	8,299	369.23
Other health services	3,616	16.66	1,141	15.55	2,136	17.63	339	15.06
Total Expenditures--1978	$167,911	$752.98	$19,875	$286.07	$98,668	$763.96	$49,366	$2,026.19
Hospital care	76,025	340.93	7,070	101.76	47,785	369.98	21,169	868.86
Physicians' services	35,250	158.08	5,215	75.06	21,124	163.56	8,910	365.70
Dentists' services	13,300	59.64	2,780	40.01	9,137	70.75	1,383	56.76
Other professional services	4,275	19.17	398	5.73	2,787	21.58	1,090	44.74
Drugs and drug sundries	15,098	67.70	2,823	40.63	9,044	70.02	3,231	132.61
Eyeglasses and appliances	3,879	17.40	481	6.92	2,793	21.62	605	24.83
Nursing-home care	15,751	70.64	68	1.00	3,057	23.67	12,624	518.14
Other health services	4,333	19.43	1,040	14.97	2,941	22.77	354	14.53

[a] In millions. [b] Revised estimates.

Source: Gibson, R.M. and Fisher, C. R.: Age Differences in Health Care Spending, Fiscal Year 1977. Social Security Bulletin 42:6, January 1979.

Fisher, C.R.: Differences by Age Groups in Health Care Spending. Health Care Finacing Review 1:81, Spring 1980.

Financing Mechanisms for the Provision of Health Services

For the majority of the U.S. population, the present system for financing health care services--through private insurance and government programs--has been successful in providing access to care. The growth of private and government insurance and prepayment programs has been associated with increased expenditures and better protection against the financial consequences of unexpected illnesses.

- In 1980, 57.8 percent of total health expenditures were paid with private funds, down from 74.1 percent in 1965. 60.3 percent of personal health care expenditures were financed by private funds.
- In 1980, only 45.5 percent of personal expenditures for hospital care were financed by private funds. 73.6 percent of expenditures on physicians' services were private.
- Of the total personal health care expenditures for the aged in 1978, 63.2 percent ($32.2 billion) were paid by public funds. Medicare accounted for over two-thirds of this amount. 87.5 percent of hospital expenditures and 59.4 percent of expenditures for physicians' services for the aged were public funds.
- Public assistance vendor medical payments, or Medicaid, increased 87 percent, from $14.2 billion in 1975 to $26.6 billion in 1980.
- In 1977, an estimated 168.2 million different Americans, or 78.0 percent of the civilian population, were protected by some form of private health insurance.
- 49.3 million different Americans (22.8 percent) had private dental care insurance in 1977.
- In 1977, $41.6 billion were paid in private insurance benefits, compared to $15.7 billion in 1970.

Table 34—Social Welfare Expenditures Under Public Programs, Selected Fiscal Years 1950-1979

Fiscal Year	Total Social Welfare	Expenditures by Program (millions)						
		Social Insurance	Public Aid	Health & Medical Programs	Veterans' Programs	Education	Housing	Other Social Welfare
1950	$ 23,508	$ 4,947	$ 2,496	$ 2,064	$ 6,866	$ 6,674	$ 15	$ 448
1960	52,293	19,307	4,101	4,464	5,479	17,626	177	1,139
1965	77,175	28,123	6,283	6,246	6,031	28,108	318	2,066
1970	145,856	54,691	16,488	9,907	9,078	50,845	701	4,145
1971	171,908	66,369	21,262	11,087	10,456	56,704	1,047	4,983
1972	191,357	74,809	26,078	12,866	11,522	59,385	1,332	5,364
1973	213,942	86,166	28,691	13,447	13,026	64,734	2,180	5,698
1974	239,397	99,002	31,520	14,953	14,112	70,534	2,554	6,721
1975	290,047	123,013	41,326	17,708	17,019	80,863	3,172	6,947
1976	332,385	145,703	48,693	19,392	19,005	87,749	3,371	8,472
1977	360,925	160,883	53,266	20,409	19,015	93,921	4,358	9,071
1978	394,382	174,935	59,394	22,930	19,744	101,592	5,225	10,563
1979[a]	428,401	193,588	64,649	24,496	20,523	108,279	6,226	10,640

Note: Represents expenditures under public law and from trust accounts, including administration, capital outlay, and some payments outside the United States. [a]Preliminary estimates.

Source: McMillan, A. W. and Bixby, A. K.: Social Welfare Expenditures, Fiscal Year 1978. Research and Statistics Note No. 2:3, February 14, 1980; Bixby, A.K.: Public Social Welfare Expenditures, Fiscal Year 1979. Research and Statistics Note No. 4:2, June 4, 1981.

Table 35—Consumer Price Index, Selected Years 1950-1980

	Year											
Item	1950	1960	1965	1970	1973	1974	1975	1976	1977	1978	1979	1980
All Items	72.1	88.7	94.5	116.3	133.1	147.7	161.2	170.5	181.5	195.4	217.4	246.8
Less medical care	NA	89.4	94.9	116.1	132.9	147.7	160.9	169.7	180.3	194.0	216.1	245.5
Medical care	53.7	79.1	89.5	120.6	137.7	150.5	168.6	184.7	202.4	219.4	239.7	265.9
Food	74.5	88.0	94.4	114.9	141.4	161.7	175.4	180.8	192.2	211.4	234.5	254.6
Apparel and upkeep	79.0	89.6	93.7	116.1	126.8	136.2	142.3	147.6	154.2	159.6	166.6	178.4
Housing	72.8	90.2	94.9	118.2	133.7	148.8	164.5	174.6	186.5	202.8	227.6	263.3
Transportation	68.2	89.6	95.9	112.7	123.8	137.7	150.6	165.5	177.2	185.5	212.0	249.7
Entertainment	NA	NA	NA	116.7	130.0	139.8	152.2	159.8	167.7	176.6	188.5	205.3
Other goods & services	NA	NA	NA	116.8	132.5	142.0	153.9	162.7	172.2	183.3	196.7	214.5
All services	58.7	83.5	92.2	121.6	139.1	152.1	166.6	180.4	194.3	210.9	234.2	270.3
Energy	NA	94.2	96.3	107.0	123.5	159.7	176.6	189.3	207.3	220.4	275.9	361.1

Note: 1967 = 100; data are annual averages; data beginning 1978 are for all urban consumers; earlier data are for urban wage earners and clerical workers; NA indicates not available.

Source: U.S. Office of the President: Economic Report of the President. Government Printing Office: 289, 292, 1981.

U.S. Department of Labor, Bureau of Labor Statistics: CPI Detailed Reports: 79-81, January 1981.

Table 36—Medical Care Component of the Consumer Price Index, Selected Years 1950-1980

Item	Year											
	1950	1960	1965	1970	1973	1974	1975	1976	1977	1978	1979	1980
Medical care total	53.7	79.1	89.5	120.6	137.7	150.5	168.6	184.7	202.4	219.4	239.7	265.9
Medical care services	49.2	74.9	87.3	124.2	144.3	159.1	179.1	197.1	216.7	235.4	258.3	287.4
Physicians' services	55.2	77.0	88.3	121.4	138.2	150.9	169.4	188.5	206.0	223.1	243.6	269.3
Dentists' services	63.9	82.1	92.2	119.4	136.4	146.8	161.9	172.2	185.1	198.1	214.8	240.2
Semi-private hosp. room	30.3	57.3	75.9	145.4	182.1	201.5	236.1	268.6	299.5	332.4	370.3	418.9
Prescription drugs	92.6	115.3	102.0	101.2	100.5	102.9	109.3	115.2	122.1	131.6	141.8	154.8
Over-the-counter drugs	NA	NA	98.0	106.2	112.4	117.5	130.1	138.9	148.5	159.0	170.7	188.1

Note: 1967 = 100; data are annual averages; data beginning 1978 are for all urban consumers; earlier data are for urban wage earners and clerical workers; NA indicates not available.

Source: U. S. Department of Health and Human Services: Medical Care Component of the Consumer Price Index for Urban Wage and Clerical Workers, 1940-79. Social Security Bulletin 43:73-74, December 1980.

U.S. Department of Labor, Bureau of Labor Statistics: CPI Detailed Reports: 87, January 1981.

Table 37—Annual Percentage Change in the Consumer Price Index, Selected Years 1965-1980

	Annual Percentage Change in the Annual Average CPI											
Item	1965-66	1968-69	1969-70	1970-71	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
All Items	2.9	5.4	5.9	4.3	6.2	11.0	9.1	5.8	6.5	7.7	11.3	13.5
Less medical care	3.0	5.4	5.8	4.1	6.4	11.1	8.9	5.5	6.2	7.6	11.4	13.6
Medical care	4.4	6.9	6.3	6.5	3.9	9.3	12.0	9.5	9.6	8.4	9.3	10.9
Food	5.0	5.1	5.5	3.0	14.5	14.4	8.5	3.1	6.3	10.0	10.9	8.6
Apparel and upkeep	2.6	5.8	4.1	3.2	3.7	7.4	4.5	3.7	4.5	3.5	4.4	7.1
Housing	2.4	6.2	7.1	4.4	4.4	11.3	10.6	6.1	6.8	8.7	12.2	15.7
Transportation	1.4	3.9	5.1	5.2	3.3	11.2	9.4	9.9	7.1	4.7	14.3	17.8
Entertainment	NA	5.0	5.1	5.3	2.8	7.5	8.9	5.0	4.9	5.3	6.7	8.9
Other goods & services	NA	4.9	5.8	4.8	3.9	7.2	8.4	5.7	5.8	6.4	7.3	9.0
All services	3.9	6.9	8.1	5.6	4.4	9.3	9.5	8.3	7.7	8.5	11.0	15.4
Energy	1.6	2.7	2.7	3.9	8.0	29.3	10.6	7.2	9.5	6.3	25.2	30.9

Note: Data are annual averages; data beginning 1978 are for all urban consumers; earlier data are for urban wage earners and clerical workers; NA indicates not available.

Source: U.S. Office of the President: Economic Report of the President. U.S. Government Printing Office: 289, 292, 1981.
U.S. Department of Labor, Bureau of Labor Statistics: CPI Detailed Reports: 79-81, January 1981.

Table 38—Annual Percentage Change in the Medical Care Component of the Consumer Price Index, Selected Years 1965-1980

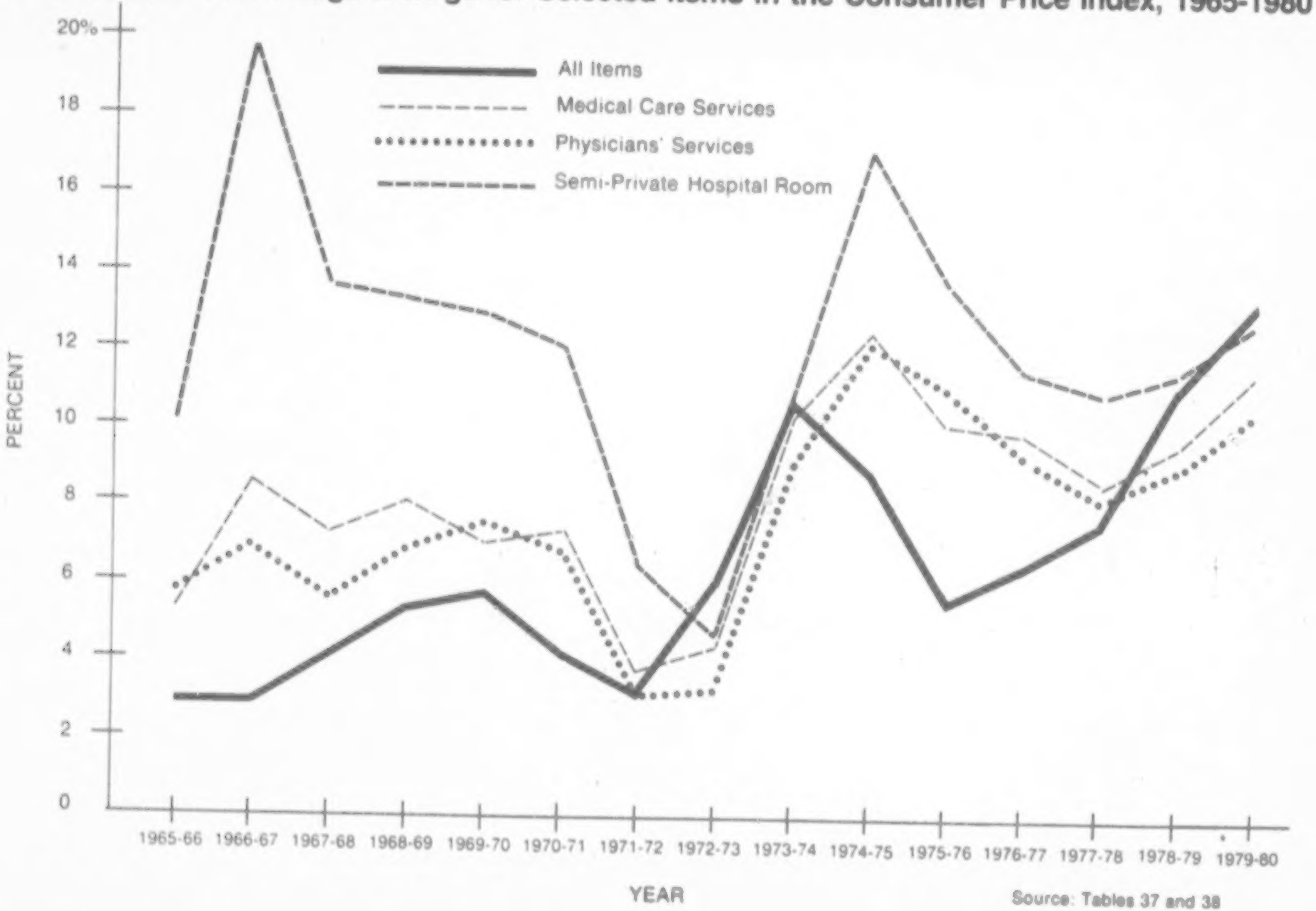
Item	Annual Percentage Change in the Annual Average CPI											
	1965 -66	1968 -69	1969 -70	1970 -71	1972 -73	1973 -74	1974 -75	1975 -76	1976 -77	1977 -78	1978 -79	1979 -80
Medical care total	4.4	6.9	6.3	6.5	3.9	9.3	12.0	9.5	9.6	8.4	9.3	10.9
Medical care services	5.4	8.1	7.1	7.3	4.4	10.3	12.6	10.1	9.9	8.6	9.7	11.3
Physicians' services	5.8	6.9	7.5	6.9	3.3	9.2	12.3	11.3	9.3	8.3	9.2	10.6
Dentists' services	3.3	7.0	5.8	6.4	3.1	7.6	10.3	6.4	7.5	7.0	8.4	11.8
Semi-private hospital room	10.0	13.4	12.9	12.2	4.7	10.7	17.2	13.8	11.5	11.0	11.4	13.1
Prescription drugs	-0.2	1.3	1.6	0.1	-0.4	2.4	6.2	5.4	6.0	7.8	7.8	9.2
Over-the-counter drugs	1.0	0.7	2.9	3.9	1.0	4.5	10.7	6.8	6.9	7.1	7.4	10.2

Note: Data are annual averages; data beginning 1978 are for all urban consumers; earlier data are for urban wage earners and clerical workers.

Source: U. S. Department of Health and Human Services: Medical Care Component of the Consumer Price Index for Urban Wage and Clerical Workers, 1940-80. Social Security Bulletin 43: 73-74, December 1980.

U.S. Department of Labor, Bureau of Labor Statistics: CPI Detailed Reports: 87, January 1981.

Figure 18—Annual Percentage Change for Selected Items in the Consumer Price Index, 1965-1980



Source: Tables 37 and 38

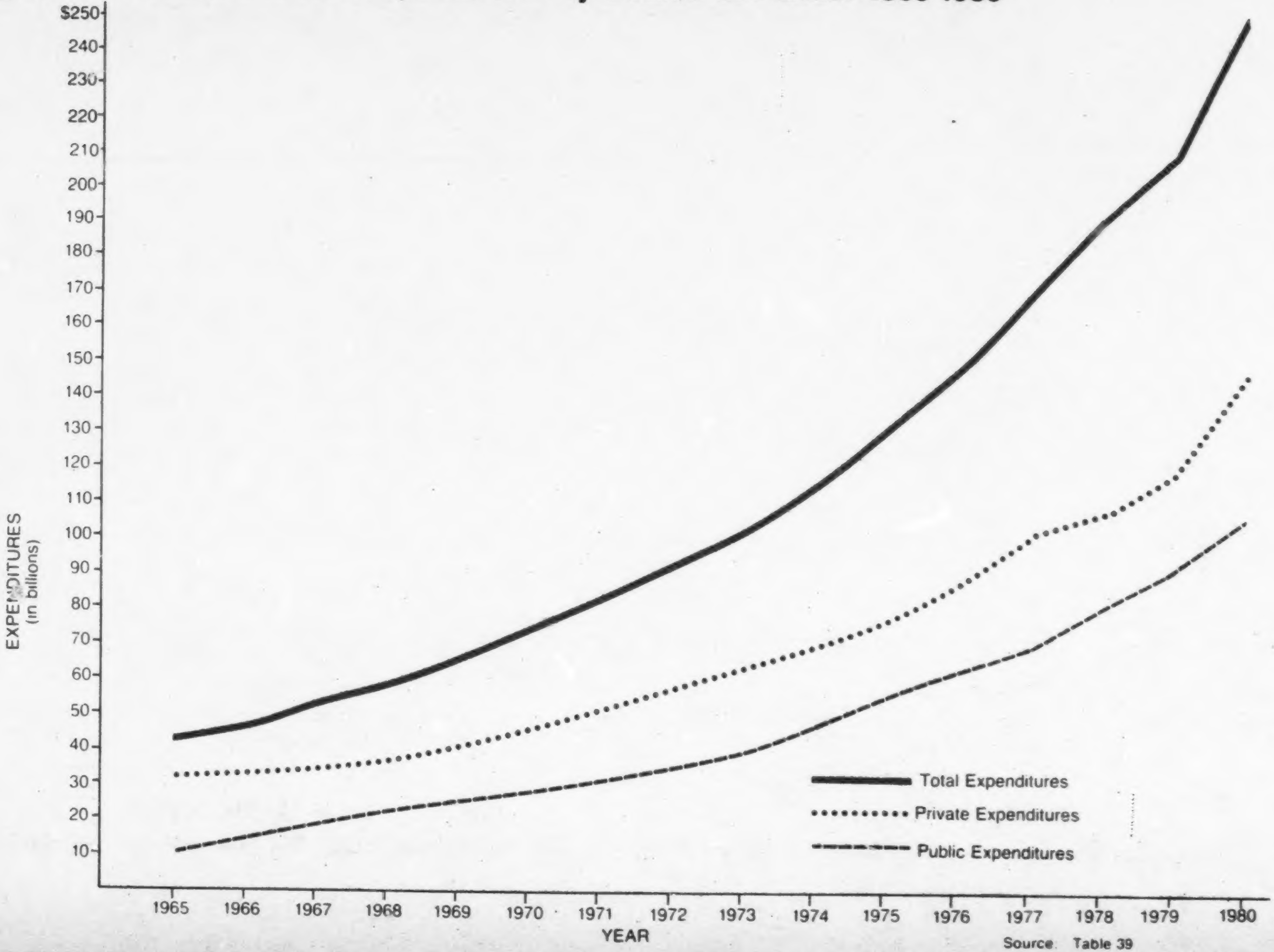
Table 39—National Health Expenditures by Source of Funds, Selected Years 1929-1980

	Health Expenditures							
	Total		Private			Public		
Year	Amount (billions)	Per Capita	Amount (billions)	Per Capita	% of Total	Amount (billions)	Per Capita	% of Total
1929	$ 3.6	$ 29.49	$ 3.2	$ 25.49	86.4%	$ 0.5	$ 4.00	13.6%
1940	4.0	29.62	3.2	23.61	79.7	0.8	6.03	20.3
1950	12.7	81.86	9.2	59.62	72.8	3.4	22.24	27.2
1960	26.9	146.30	20.3	110.20	75.3	6.6	36.10	24.7
1965	41.7	210.89	30.9	156.32	74.1	10.8	54.57	25.9
1970	74.7	357.90	46.9	224.68	62.8	27.8	133.22	37.2
1971	83.3	394.23	51.6	244.36	62.0	31.7	149.87	38.0
1972	93.5	437.77	58.1	271.89	62.1	35.4	165.88	37.9
1973	103.2	478.34	63.9	296.19	61.9	39.3	182.15	38.1
1974	116.4	534.63	69.3	318.18	59.5	47.1	216.44	40.5
1975	132.7	603.57	76.5	348.08	57.7	56.2	255.49	42.3
1976	149.7	674.14	86.7	390.63	57.9	62.9	283.51	42.1
1977	169.2	754.81	99.1	442.14	58.6	70.1	312.67	41.4
1978	189.3	835.57	110.0	485.29	58.1	79.4	350.27	41.9
1979	214.6	936.92	124.5	543.61	58.0	90.1	393.31	42.0
1980	247.2	1,067.06	143.0	617.10	57.8	104.2	449.96	42.2

Note: Components may not add to total because of rounding.

Source: Gibson, R. M. and Waldo, D. R.: National Health Expenditures, 1980. Health Care Financing Review 3:18-19, September 1981.

Figure 19—National Health Expenditures by Source of Funds: 1965-1980



Source: Table 39

Table 40—National Health Expenditures by Type of Expenditure and Source of Funds, 1980

Type of Expenditure	Total Expenditures	Private Funds			Public Funds		
		Total	Direct Payment	Other[a]	Total	Federal	State & Local
Total	$ 247.2	$ 143.0	$ 70.6	$ 72.4	$ 104.2	$ 70.9	$ 33.3
Health services & supplies	235.6	138.7	70.6	68.1	96.9	65.7	31.3
Hospital care	99.6	45.3	9.1	36.2	54.2	41.3	12.9
Physicians' services	46.6	34.3	17.4	16.9	12.3	9.4	2.9
Dentists' services	15.9	15.3	12.0	3.3	0.6	0.3	0.3
Other professional services	5.4	3.9	3.2	0.7	1.5	1.0	0.4
Drugs and medical sundries	19.2	17.7	15.9	1.8	1.6	0.8	0.8
Eyeglasses and appliances	5.1	4.6	4.4	0.2	0.5	0.4	0.1
Nursing-home care	20.7	9.0	8.7	0.3	11.8	6.4	5.3
Other health services	5.4	1.4	--	1.4	4.0	2.8	1.2
Expenses for prepayment and administration	10.4	7.2	--	7.2	3.2	2.0	1.3
Government public health activities	7.3	--	--	--	7.3	1.2	6.1
Research & construction of medical facilities	11.6	4.3	--	4.3	7.3	5.3	2.0
Research	5.4	0.3	--	0.3	5.1	4.7	0.5
Construction	6.1	4.0	--	4.0	2.2	0.6	1.6

Note: Expenditures in billions of dollars. Components may not add to totals because of rounding.

[a] Private health insurance benefits, spending by philanthropic organizations, industrial inplant services and privately financed construction.

Source: Gibson, R. M. and Waldo, D. R.: National Health Expenditures, 1980. Health Care Financing Review 3: 20, September 1981.

Table 41—Aggregate, Per Capita, and Percentage Distribution of Personal Health Care Expenditures by Source of Funds, Selected Years 1950-1980

				Source of Funds					
	Total			Private			Public		
Year	Aggregate (billions)	Per Capita	Percentage	Aggregate (billions)	Per Capita	Percentage	Aggregate (billions)	Per Capita	Percentage
1950	$ 10.9	$ 70.37	100.0%	$ 8.4	$ 54.61	77.6%	$ 2.4	$ 15.78	22.4%
1955	15.7	93.29	100.0	12.0	71.86	77.0	3.6	21.43	23.0
1960	23.7	128.81	100.0	18.5	100.76	78.2	5.2	28.05	21.8
1965	35.8	180.73	100.0	28.1	141.74	78.4	7.7	38.98	21.6
1970	65.1	312.29	100.0	42.6	204.58	65.5	22.5	107.72	34.5
1971	72.0	340.64	100.0	46.3	219.50	64.4	25.6	121.14	35.6
1972	80.2	375.53	100.0	51.4	240.48	64.0	28.8	135.06	36.0
1973	88.7	411.20	100.0	56.6	262.62	63.9	32.0	148.58	36.1
1974	101.0	463.84	100.0	62.4	286.69	61.8	38.6	177.15	38.2
1975	116.8	530.97	100.0	70.7	321.21	60.5	46.1	209.77	39.5
1976	131.8	593.67	100.0	80.3	361.59	60.9	51.5	232.07	39.1
1977	148.7	663.16	100.0	90.8	404.96	61.1	57.9	258.20	38.9
1978	166.7	735.57	100.0	101.4	447.87	60.9	65.2	287.71	39.1
1979	189.1	825.68	100.0	114.8	500.96	60.7	74.4	324.73	39.3
1980	217.9	940.62	100.0	131.6	567.66	60.3	86.4	372.96	39.7

Note: Includes all expenditures for health services and supplies other than expenses for prepayment and administrative and government public health activities.

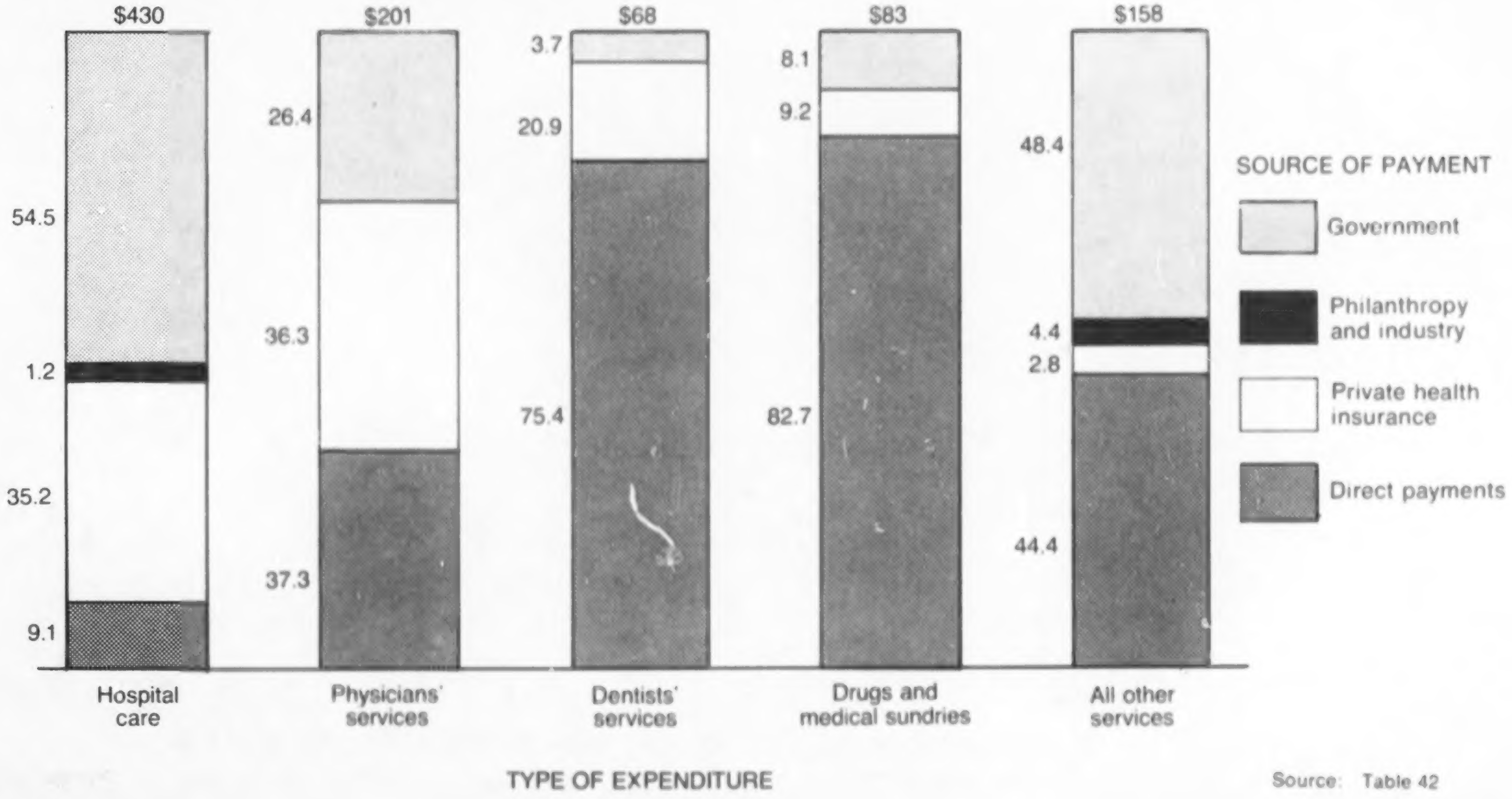
Source: Gibson, R. M. and Waldo, D. R.: National Health Expenditures, 1980. Health Care Financing Review 3: 36-38, September 1981.

Table 42—Total and Per Capita Personal Health Care Expenditures by Type of Expenditure and Source of Payment, 1980

			Third-Party Payments			
Type of Expenditure	Total	Direct Payments	Total	Private Health Insurance	Government	Philanthropy and Industry
Total (billions)	$ 217.9	$ 70.6	$ 147.3	$ 58.1	$ 86.4	$ 2.9
Hospital care	99.6	9.1	90.5	35.0	54.2	1.2
Physicians' services	46.6	17.4	29.2	16.9	12.3	--
Dentists' services	15.9	12.0	3.9	3.3	0.6	--
Other professional services	5.4	3.2	2.2	0.7	1.5	0.1
Drugs and medical sundries	19.2	15.9	3.3	1.8	1.6	--
Eyeglasses and appliances	5.1	4.4	0.7	0.2	0.5	--
Nursing-home care	20.7	8.7	12.0	0.1	11.8	0.1
Other health services	5.4	--	5.4	--	4.0	1.4
Per Capita Amount	940.62	304.65	635.97	250.65	372.96	12.36
Hospital care	429.80	39.12	390.68	151.24	234.10	5.33
Physicians' services	201.18	75.04	126.15	73.00	53.03	0.12
Dentists' services	68.42	51.61	16.82	14.27	2.54	--
Other professional services	23.30	13.84	9.47	2.95	6.26	0.25
Drugs and medical sundries	83.00	68.63	14.37	7.65	6.72	--
Eyeglasses and appliances	22.10	18.88	3.21	0.89	2.32	--
Nursing-home care	89.46	37.53	51.93	0.64	50.75	0.54
Other health services	23.34	--	23.34	--	17.22	6.12

Source: Gibson, R. M. and Waldo, D. R.: National Health Expenditures, 1980. Health Care Financing Review 3:42, September 1981.

Figure 20—Percentage Distribution of Per Capita Personal Health Care Expenditures by Type of Expenditure and Source of Payment, 1980



Source: Table 42

Table 43—Personal Health Care Expenditures for Persons Under Age 19 by Type of Expenditure and Source of Funds, 1976-1978

Type of Expenditures	Amount (millions)								
	1976			1977			1978		
	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	$16,590	$11,789	$ 4,801	$18,259	$13,053	$ 5,206	$19,875	$14,180	$ 5,696
Hospital care	5,992	3,261	2,731	6,551	3,578	2,973	7,070	3,835	3,235
Physicians' services	4,252	3,526	726	4,771	4,027	744	5,215	4,382	833
Dentists' services	2,209	1,997	212	2,493	2,279	214	2,780	2,546	234
Other professional services	314	198	116	352	172	180	398	193	205
Drug and drug sundries	2,472	2,315	157	2,624	2,473	151	2,823	2,650	173
Eyeglasses and appliances	416	397	19	439	418	21	481	459	22
Nursing-home care	55	--	55	61	2	59	68	1	67
Other health services	880	94	786	968	103	865	1,040	113	927

Source: Fisher, C.R.: Differences by Age Groups in Health Care Spending. Health Care Financing Review 1: 81-83, Spring 1980.

Table 44—Personal Health Care Expenditures for Persons Aged 19-64 by Type of Expenditure and Source of Funds, 1976-1978

	Amount (millions)								
	1976			1977			1978		
Type of Expenditures	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	$77,861	$55,367	$22,492	$87,578	$62,382	$25,196	$98,668	$70,497	$28,172
Hospital care	37,508	21,941	15,567	42,466	25,126	17,340	47,785	28,626	19,159
Physicians' services	16,901	14,318	2,583	18,848	15,923	2,925	21,124	17,808	3,316
Dentists' services	6,909	6,684	225	7,969	7,724	245	9,137	8,876	261
Other professional services	2,078	1,863	215	2,408	2,131	277	2,787	2,480	307
Drug and drug sundries	7,621	7,088	533	8,244	7,665	579	9,044	8,419	625
Eyeglasses and appliances	2,295	2,191	104	2,481	2,368	113	2,793	2,659	134
Nursing-home care	2,001	412	1,589	2,455	496	1,959	3,057	600	2,457
Other health services	2,548	869	1,679	2,708	949	1,759	2,941	1,028	1,913

Source: Fisher, C.R.: Differences by Age Groups in Health Care Spending. Health Care Financing Review 1: 81-83, Spring 1980.

Table 45—Personal Health Care Expenditures for Persons Aged 65 and Over by Type of Expenditure and Source of Funds, 1976-1978

	Amount (millions)								
	1976			1977			1978		
Type of Expenditures	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	$37,674	$13,372	$24,302	$43,303	$15,613	$27,690	$49,366	$18,192	$31,175
Hospital care	16,305	1,831	14,474	18,897	2,259	16,638	21,169	2,645	18,524
Physicians' services	6,505	2,746	3,759	7,623	3,186	4,437	8,910	3,620	5,290
Dentists' services	1,013	967	46	1,188	1,142	46	1,383	1,338	45
Other professional services	810	485	325	940	555	385	1,090	631	459
Drug and drug sundries	2,716	2,263	453	2,941	2,475	466	3,231	2,728	503
Eyeglasses and appliances	490	357	134	535	374	161	605	405	201
Nursing-home care	9,395	4,693	4,702	10,847	5,587	5,260	12,624	6,790	5,834
Other health services	440	30	410	332	33	299	354	35	319

Source: Fisher, C.R.: Differences by Age Groups in Health Care Spending. Health Care Financing Review 1: 81-33, Spring 1980.

Table 46—Public Health Care Expenditures for Persons Aged 65 and Over by Type of Expenditure and Source of Funds, 1976-1978

	Amount (millions)											
	1976				1977				1978			
Type of Expenditure	Total Public	Medi-care	Medi-caid	Other	Total Public	Medi-care	Medi-caid	Other	Total Public	Medi-care	Medi-caid	Other
Total	$24,302	$16,313	$5,644	$2,345	$27,690	$19,141	$5,999	$2,552	$31,175	$21,775	$6,611	$2,789
Hospital care	14,474	12,095	756	1,623	16,638	14,119	737	1,782	18,524	15,799	754	1,971
Physicians' services	3,759	3,474	221	64	4,437	4,132	236	69	5,290	4,954	260	76
Dentists' services	46	--	32	14	46	--	33	13	45	--	34	11
Other prof. services	325	252	67	6	385	316	62	7	459	381	72	6
Drugs & drug sundries	453	--	419	34	466	--	432	34	503	--	468	35
Eyeglasses & appliances	134	125	--	9	161	152	--	9	201	189	--	12
Nursing-home care	4,702	320	3,964	418	5,260	364	4,439	457	5,834	380	4,969	485
Other health services	410	47	185	178	299	58	60	181	319	72	54	193

Source: Fisher, C. R.: Differences by Age Groups in Health Care Spending. Health Care Financing Review 1:89, Spring 1980.

Table 47—Percentage Distribution of Personal Health Care Expenditures for Persons Under Age 19 by Type of Expenditure and Source of Funds, 1976-1978

Type of Expenditure	1976 Total	 Pri-vate	 Public	1977 Total	 Pri-vate	 Public	1978 Total	 Pri-vate	 Public
Total Personal Health Care	100.0	71.1	28.9	100.0	71.5	28.5	100.0	71.3	28.7
Hospital care	100.0	54.4	45.6	100.0	54.6	45.4	100.0	54.2	45.8
Physicians' services	100.0	82.9	17.1	100.0	84.4	15.6	100.0	84.0	16.0
Dentists' services	100.0	90.4	9.6	100.0	91.4	8.6	100.0	91.6	8.4
Other professional services	100.0	63.1	36.9	100.0	48.9	51.1	100.0	48.5	51.5
Drugs and drug sundries	100.0	93.6	6.4	100.0	94.2	5.8	100.0	93.9	6.1
Eyeglasses and appliances	100.0	95.4	4.6	100.0	95.2	4.8	100.0	95.4	4.6
Nursing-home care	100.0	-	100.0	100.0	3.3	96.7	100.0	1.5	98.5
Other health services	100.0	10.7	89.3	100.0	10.6	89.4	100.0	10.9	89.1

Source: Fisher, C.R.: Differences By Age Groups in Health Care Spending. Health Care Financing Review 1:81-83, Spring 1980.

Table 48—Percentage Distribution of Personal Health Care Expenditures for Persons Aged 19-64 by Type of Expenditure and Source of Funds, 1976-1978

	1976			1977			1978		
Type of Expenditure	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	100.0	71.1	28.9	100.0	71.2	28.8	100.0	71.4	28.6
Hospital care	100.0	58.5	41.5	100.0	59.2	40.8	100.0	59.9	40.1
Physicians' services	100.0	84.7	15.3	100.0	84.5	15.5	100.0	84.3	15.7
Dentists' services	100.0	96.7	3.3	100.0	96.9	3.1	100.0	97.1	2.9
Other professional services	100.0	89.7	10.3	100.0	88.5	11.5	100.0	89.0	11.0
Drugs and drug sundries	100.0	93.0	7.0	100.0	93.0	7.0	100.0	93.1	6.9
Eyeglasses and appliances	100.0	95.5	4.5	100.0	95.4	4.6	100.0	95.2	4.8
Nursing-home care	100.0	20.6	79.4	100.0	20.2	79.8	100.0	19.6	80.4
Other health services	100.0	34.1	65.9	100.0	35.0	65.0	100.0	35.0	65.0

Source: Fisher, C.R.: Differences by Age Groups in Health Care Spending. Health Care Financing Review 1:81-83, Spring 1980.

Table 49—Percentage Distribution of Personal Health Care Expenditures for Persons Aged 65 and Over by Type of Expenditure and Source of Funds, 1976-1978

Type of Expenditure	1976			1977			1978		
	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	100.0	35.5	64.5	100.0	36.1	63.9	100.0	36.8	63.2
Hospital care	100.0	11.2	88.8	100.0	12.0	88.0	100.0	12.5	87.5
Physicians' services	100.0	42.2	57.8	100.0	41.8	58.2	100.0	40.6	59.4
Dentists' services	100.0	95.5	4.5	100.0	96.1	3.9	100.0	96.7	3.3
Other professional services	100.0	59.9	40.1	100.0	59.0	41.0	100.0	57.9	42.1
Drugs and drug sundries	100.0	83.3	16.7	100.0	84.2	15.8	100.0	84.4	15.6
Eyeglasses and appliances	100.0	72.9	27.3	100.0	69.9	30.1	100.0	66.9	33.2
Nursing-home care	100.0	50.0	50.0	100.0	51.5	48.5	100.0	53.8	46.2
Other health services	100.0	6.8	93.2	100.0	9.9	90.1	100.0	9.9	90.1

Source: Fisher, C.R.: Differences by Age Groups in Health Care Spending. Health Care Financing Review 1:81-83, Spring 1980.

Medical Education and Medical Manpower

The U.S. medical education system has provided the professional training for most of the physicians in the United States. Hence, the supply of physicians reflects the number and characteristics of students graduated from that system. The requirements for medical licensure in this country, however, affect all physicians practicing in the United States regardless of country of training.

The past decade has witnessed not only substantial growth in the number of medical schools and students graduated, but also significant changes in the type of student enrolled. Women, blacks, and other minorities are represented in increasing proportions of medical school graduates and licentiates.

The following data summarize some characteristics of the medical education and licensure system in the United States.

- The number of graduates from U.S. medical and basic science schools was 15,135 in 1979-1980, up 80.9 percent from the 1969-1970 academic year. In addition, the number of U.S. medical schools increased by 25 during the same period.
- Women represented 23.1 percent of all graduates from medical schools in 1979-1980, compared to 8.4 percent in 1969-1970. The proportion of women enrolled in medical school has increased from 9.0 percent in 1969-1970 to 25.4 percent in 1979-1980.
- U.S. minority groups enrolled in medical schools increased from 7.4 percent of total enrollment in 1973-1974 to 13.1 percent in 1979-1980.
- The proportion of foreign nationals enrolled in U.S. medical schools declined from 1.5 percent in 1973-1974 to 1.2 percent in 1979-1980.
- Although 29.9 percent of all U.S. families in 1976-1977 earned under $10,000, medical students from families in this income group constituted only 15.8 percent of all medical students enrolled.
- In 1980, 64,615 were enrolled in medical residency programs in the U.S., up from 52,685 in 1974. Slightly more than one-fourth of these residents were in internal medicine, followed in popularity by surgery and family practice.
- In 1979, 17.9 percent of new medical licentiates were graduates of foreign medical schools. The highest proportion of FMG licentiates (46.0 percent) was recorded in 1972 and has been decreasing since that time.

Table 50—Percentage Distribution of Public Health Care Expenditures for Persons Aged 65 and Over by Type of Expenditure and Source of Funds, 1976-1978

Type of Expenditure	1976				1977				1978			
	Total Public	Medicare	Medicaid	Other	Total Public	Medicare	Medicaid	Other	Total Public	Medicare	Medicaid	Other
Total Personal Health Care	64.5	43.3	15.0	6.2	63.9	44.2	13.9	5.9	63.2	44.1	13.4	5.7
Hospital care	88.8	74.2	4.6	10.0	88.0	74.7	3.9	9.4	87.5	74.6	3.6	9.3
Physicians' services	57.8	53.4	3.4	1.0	58.2	54.2	3.1	0.9	59.4	55.6	2.9	0.9
Dentists' services	4.6	--	3.2	1.4	3.9	--	2.8	1.1	3.2	--	2.4	0.8
Other professional services	40.1	31.1	8.3	0.7	41.0	33.6	6.6	0.7	42.1	35.0	6.6	0.6
Drugs and drug sundries	16.7	--	15.4	1.3	15.8	--	14.7	1.1	15.6	--	14.5	1.1
Eyeglasses and appliances	27.3	25.5	--	1.8	30.1	28.4	--	1.7	33.2	31.2	--	2.0
Nursing-home care	50.0	3.4	42.2	4.4	48.5	3.4	40.9	4.2	46.2	3.0	39.4	3.8
Other health services	93.2	10.7	42.0	40.5	90.1	17.5	18.1	54.5	90.1	20.3	15.3	54.5

Source: Fisher, C. R.: Differences by Age Groups in Health Care Spending. Health Care Financing Review 1:89, Spring 1980.

Table 51—Expenditures Under Medicaid (Public Assistance Vendor Medical Payments) by Type of Expenditure, 1970, 1975, and 1980

	Expenditures (billions)					
	1970		1975		1980	
Type of Expenditure	Amount	Percent	Amount	Percent	Amount	Percent
Total	$5.5	100.0%	$14.2	100.0%	$26.6	100.0%
Hospital care	2.2	40.0	4.7	33.1	9.5	35.7
Physicians' services	0.7	12.7	1.9	13.4	2.3	8.6
Dentists' services	0.2	3.6	0.4	2.8	0.5	1.9
Other professional services	0.1	1.8	0.2	1.4	0.5	1.9
Drugs and medical sundries	0.4	7.3	0.9	6.3	1.3	4.9
Eyeglasses and appliances	--	--	--	--	--	--
Nursing-home care	1.4	25.5	4.9	34.5	10.3	38.7
Other health services	0.2	3.6	0.6	4.2	0.8	3.0
Administration	0.3	5.5	0.6	4.2	1.3	4.9
Government public health activities	--	--	--	--	--	--

Note: Includes funds paid into Medicare trust funds by states under "buy-in" agreements to cover premiums for public assistance recipients and for persons who are medically indigent.

Source: Gibson, R. M. and Waldo, D. R.: National Health Expenditures, 1980. _Health Care Financing Review_ 3:48-52, September 1981.

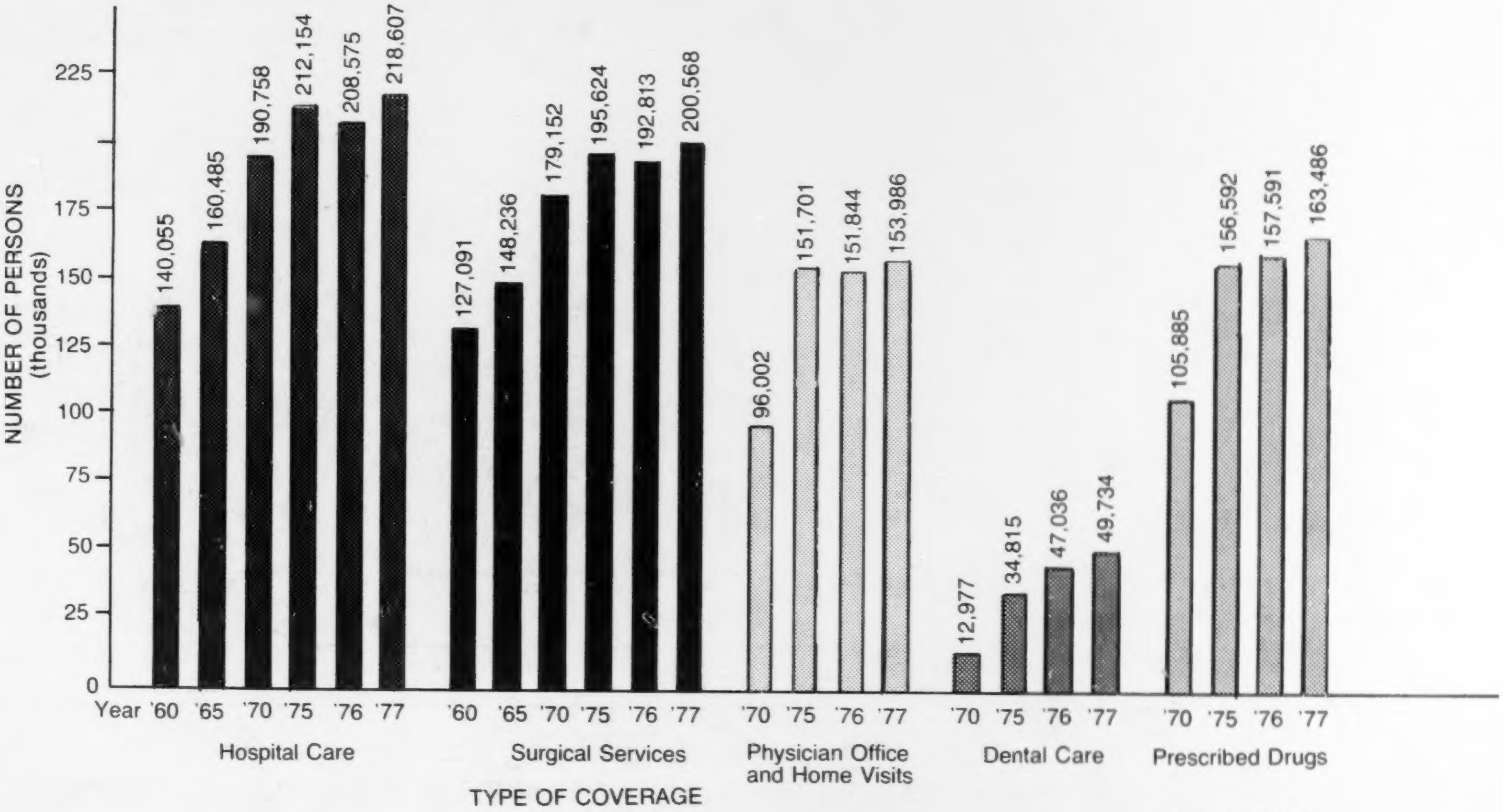
Table 52—Gross Enrollment Under Private Health Insurance Plans by Type of Coverage, Selected Years 1950-1977

Year	Hospital Care	M.D. Surgical Services	M.D. Office and Home Visits[a]	Dental Care[a]	Prescribed Drugs[a]	Private Duty Nursing[a]	Visiting Nurse Service[a]	Nursing Home Care[a]
1950	81,691	55,950						
1960	140,055	127,091						
1970	190,758	179,152	96,002	12,977	105,885	105,118	112,073	32,989
1972	197,195	183,936	104,735	18,750	117,082	114,269	121,520	46,315
1973	200,710	189,015	114,496	22,008	131,570	124,637	128,678	70,469
1974	206,646	193,172	150,612	32,896	149,244	148,113	143,382	71,202
1975	212,154	195,624	151,701	34,815	156,592	153,076	148,475	71,505
1976	208,575	192,813	151,844	47,036	157,591	153,817	152,566	71,782
1977	218,607	200,568	153,986	49,734	163,486	161,415	162,403	69,429
	Estimates of Net Number of Different Persons and Percent of Civilian Population Covered:							
				Number				
1975	162,378	160,244	127,735	34,477	149,276	145,927	141,561	70,146
1976	164,235	162,179	124,124	46,578	150,222	147,311	145,863	70,422
1977	168,212	163,864	121,711	49,250	149,896	148,584	151,788	65,889
				Percent				
1975	76.4	75.4	60.1	16.2	70.3	68.7	66.6	33.0
1976	76.8	75.8	58.0	21.8	70.2	68.9	68.2	32.9
1977	78.0	76.0	56.4	22.8	69.5	68.9	70.4	30.6

Note: All numbers are in thousands. [a]Data not available before 1966.

Source: Carroll, M. S., and Arnett, R. H.: Private Health Insurance Plans in 1977: Coverage, Enrollment, and Financial Experience. Health Care Financing Review 1:3-22, Fall 1979.

Figure 21—Gross Enrollments Under Private Health Insurance Plans by Type of Coverage, Selected Years 1960-1977



Source: Table 52

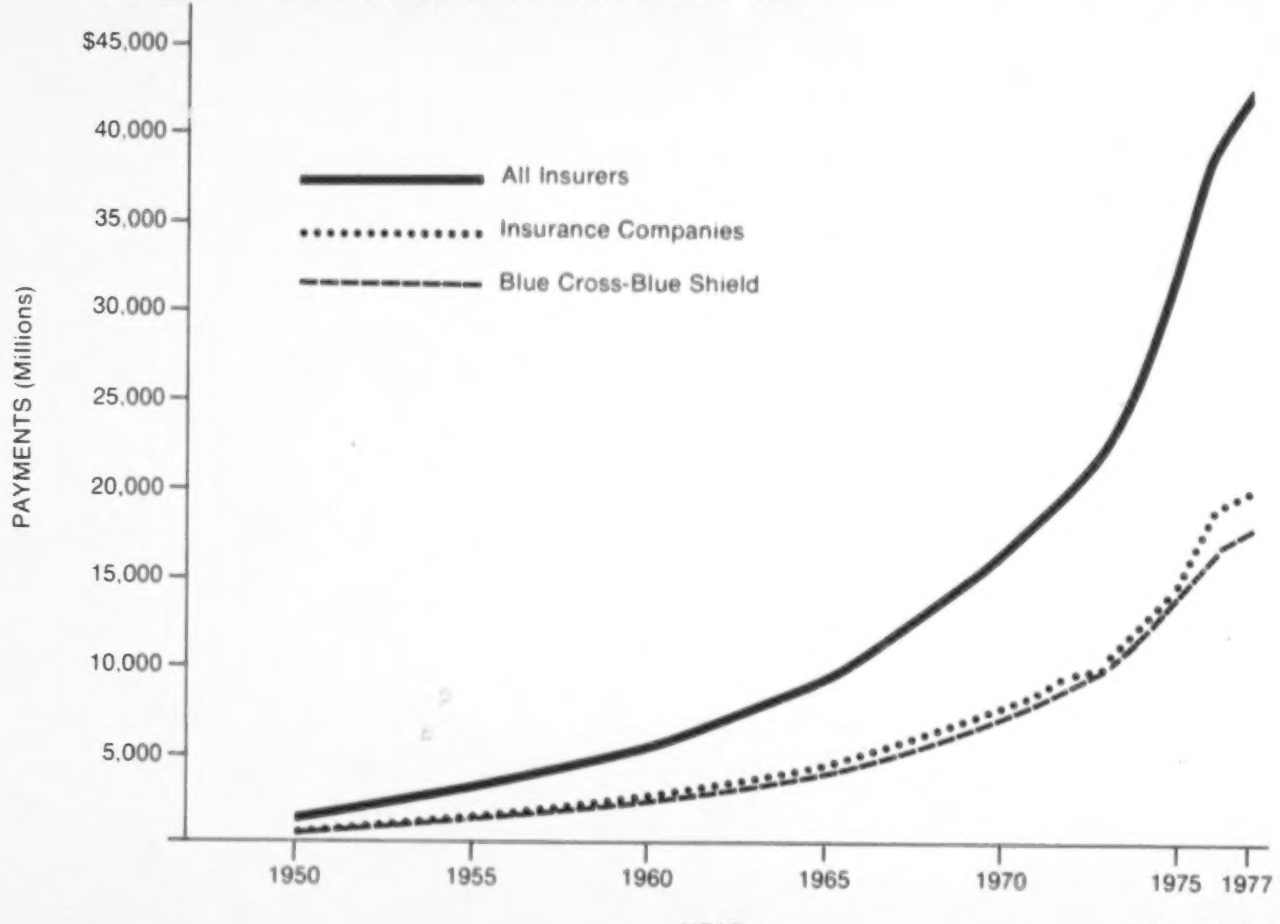
Table 53—Private Health Insurance Benefit Expenditures by Type of Insurer, Selected Years 1950-1977

	Amount (millions)							
		Blue Cross-Blue Shield			All Other Insurance Companies			
Year	All Insurers	Total	Blue Cross	Blue Shield	Total	Group Policies	Individual Policies	Independent Plans
1950	$ 991.9	$ 490.6	$ 382.9	$ 107.7	$ 400.0	$ 257.0	$ 143.0	$ 101.3
1955	2,535.7	1,146.7	832.2	314.5	1,179.0	858.0	321.0	210.0
1960	4,996.3	2,287.1	1,646.2	640.9	2,389.0	1,901.0	488.0	320.2
1965	8,728.9	3,912.9	2,853.4	1,059.5	4,265.0	3,413.0	852.0	551.0
1970	15,743.7	7,060.2	5,009.3	2,050.9	7,656.1	6,510.1	1,146.0	1,027.4
1971	17,713.6	8,178.7	5,906.9	2,271.8	8,341.5	7,067.5	1,274.0	1,193.4
1972	19,432.8	8,990.9	6,501.3	2,489.6	9,123.6	7,757.5	1,366.0	1,318.3
1973	21,911.7	10,004.2	7,187.3	2,816.9	9,962.1	8,405.9	1,556.2	1,945.4
1974	25,871.4	11,639.5	8,311.1	3,328.4	11,659.3	10,125.8	1,533.5	2,572.6
1975	31,917.3	14,192.0	10,075.9	4,116.1	14,525.6	12,956.6	1,569.0	3,199.7
1976	38,418.4	16,226.5	11,624.9	4,601.6	18,365.0	16,633.8	1,731.2	3,826.9
1977	41,594.5	17,626.2	12,473.7	5,152.5	19,514.3	17,591.9	1,922.4	4,454.0

Note: Data for 1973-1977 are preliminary estimates from HCFA surveys.

Source: Carroll, M. S. and Arnett, R. H.: Private Health Insurance Plans in 1977: Coverage, Enrollment, and Financial Experience. Health Care Financing Review 1:3-22, Fall 1979.

Figure 22 — Private Health Insurance Benefit Expenditures by Type of Insurer, Selected Years 1950-1977



Source: Table 53

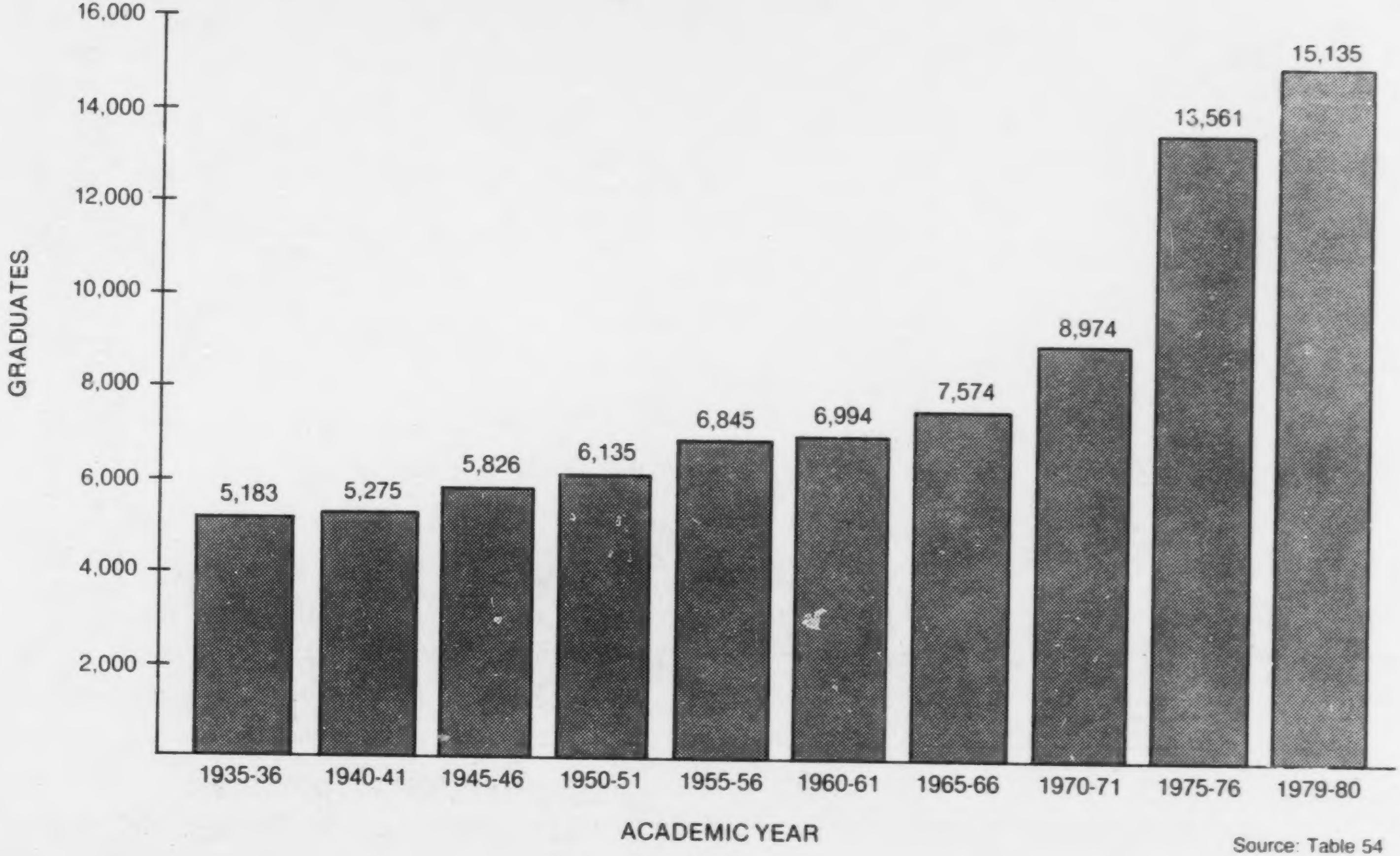
Table 54—Students and Graduates in Medical and Basic Science Schools, Selected Years 1940-1980

Year	Number of Schools[a]	Enrollment			Graduates
		Total	First Year	Intermediate Years	
1940-41	77	21,379	5,837	10,267	5,275
1945-46	77	23,216	6,060	11,330	5,826
1950-51	79	26,186	7,177	12,874	6,135
1955-56	82	28,639	7,686	14,108	6,845
1960-61	86	30,288	8,298	14,996	6,994
1965-66	88	32,835	8,759	16,502	7,574
1970-71	103	40,487	11,348	20,165	8,974
1971-72	108	43,650	12,361	21,738	9,551
1972-73	112	47,546	13,726	23,429	10,391
1973-74	114	50,886	14,185	25,088	11,613
1974-75	114	54,074	14,963	26,397	12,714
1975-76	114	56,244	15,351	27,332	13,561
1976-77	116	58,266	15,667	28,992	13,607
1977-78	122	60,456	16,134	29,929	14,393
1978-79	125	62,754	16,620	31,168	14,966
1979-80	126	64,195	17,014	32,046	15,135

[a] Prior to 1956-1957, schools in development were not included.

Source: American Medical Association: Medical Education in the United States, 1972-1973. JAMA 226: 910, November 19, 1973; Medical Education in the United States, 1979-1980. JAMA 244:2813, December 26, 1980.

Figure 23—Medical and Basic Science School Graduates, Selected Academic Years 1935-1980



Source: Table 54

Table 55—Women in U.S. Medical Schools, Selected Years 1949-1980

Academic Year	Women Applicants		Women in Entering Class		Total Women Enrolled		Women Graduates	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
1949-50	1,390	5.7%	387	5.5%	1,806	7.2%	595	10.7%
1959-60	1,026	6.9	494	6.0	1,710	5.7	405	5.7
1964-65	1,731	9.0	786	8.9	2,503	7.7	503	6.8
1969-70	2,289	9.4	952	9.2	3,390	9.0	700	8.4
1970-71	2,734	10.9	1,256	11.1	3,894	9.6	827	9.2
1971-72	3,737	12.8	1,693	13.7	4,755	10.9	860	9.0
1972-73	5,480	15.2	2,315	16.9	6,099	12.8	924	8.9
1973-74	7,202	17.8	2,743	19.6	7,731[a]	15.4[a]	1,264	11.1
1974-75	8,712	20.4	3,260	22.3	9,786	18.1	1,706	13.4
1975-76	9,575	22.6	3,656	23.8	11,527	20.5	2,200	16.2
1976-77	10,244	24.3	3,876	24.7	13,059	22.4	2,611	19.2
1977-78	10,195	25.1	4,149	25.7	14,373	23.8	3,086	21.4
1978-79	9,561	26.1	4,184	25.2	15,293	24.4	3,445	23.0
1979-80	10,222	28.3	4,748	27.9	16,315	25.4	3,497	23.1

[a] Harvard did not provide enrollment figures.

Source: American Medical Association: Medical Education in the United States, 1972-1973. JAMA 226: 910, November 19, 1973; Medical Education in the United States, 1979-1980. JAMA 244:2814, December 26, 1980.

Table 56—Minority Groups and Country of Origin of Foreign Students Enrolled in U.S. Medical Schools, 1973-1974 and 1979-1980

Student Group	1973-1974		1979-1980	
	Number	% of Total Enrollment	Number	% of Total Enrollment
U.S. Minority Groups	3,706	7.4	8,318	13.0
Black	2,961	5.9	3,663	5.7
American Indian	93	0.2	194	0.3
Mexican-American	512	1.0	960	1.5
Puerto Rican	140[a]	0.3[a]	1,053	1.6
Other Hispanic[b]	--	--	603	0.9
Asian or Pacific Islander[b]	--	--	1,845	2.9
Foreign Nationals	758	1.49	760	1.20
Far East	216	0.42	299	0.47
Near and Middle East	55	0.11	49	0.08
Europe	88	0.17	89	0.14
Central America	209	0.41	160	0.25
South America	44	0.09	43	0.07
Africa	136	0.27	107	0.17
Oceania	10	0.02	13	0.02
Canada	NA	--	NA	NA
Other	NA	--	NA	NA

[a] Mainland only; University of Puerto Rico excluded from count. [b] Enrollment not reported in 1973-1974.

Source: American Medical Association: Medical Education in the United States, 1973-1974. JAMA 231:18, 20, 1975; Medical Education in the United States, 1979-1980. JAMA 244:2813-2814, December 26, 1980.

Table 57—Distribution of Medical Students by Parental Income and Control of Medical School, 1976-1977

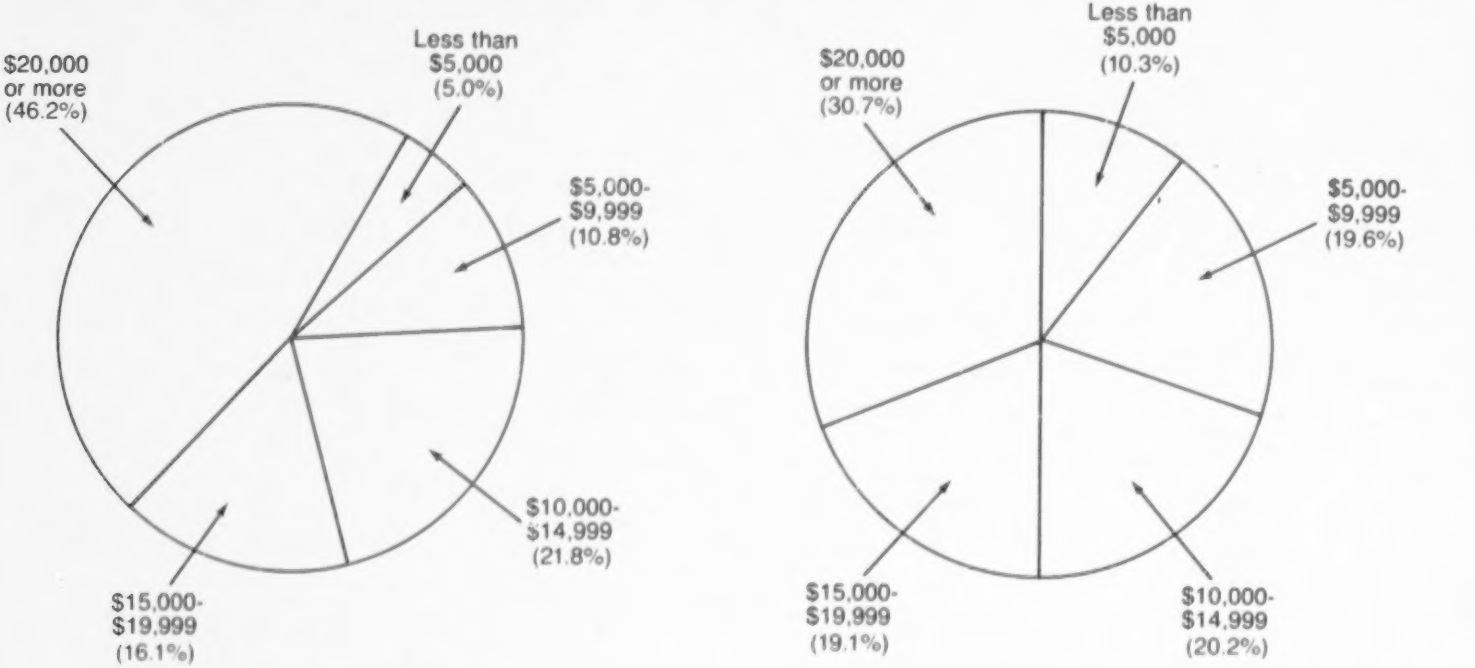
Family Income	All Families		Medical Students					
			All Schools		Public Schools		Private Schools	
	Number[a]	Percent	Number	Percent	Number	Percent	Number	Percent
Total	56,710	100.0%	52,314	100.0%	30,604	100.0%	21,710	100.0%
Under $5,000	5,842	10.3	2,632	5.0	1,511	4.9	1,121	5.2
$5,000-$9,999	11,124	19.6	5,666	10.8	3,528	11.5	2,138	9.8
$10,000-$14,999	11,481	20.2	11,389	21.8	7,249	23.7	4,140	19.1
$15,000-$19,999	10,824	19.1	8,441	16.1	5,265	17.2	3,176	14.6
$20,000 or more	17,437	30.7	24,186	46.2	13,051	42.6	11,135	51.3
Estimated Median	$14,958		$22,000[b]		$21,500[b]		$25,000[b]	

[a] In thousands. [b] Estimate.

Source: Dube, W.F.: Descriptive Study of Enrolled Medical Students, 1976-1977. DHEW Publication No. (HRA) 78-80. Hyattsville, Md.: Health Resources Administration: 55, 1978.

U.S. Department of Commerce: Money Income in 1976 of Families and Persons in the United States. Current Population Reports Series P-60, No. 114: 63, July 1978.

Figure 24—Percentage Distribution of Medical Students by Parental Income Compared to All Families, 1976-1977



PARENTS OF MEDICAL STUDENTS

ALL FAMILIES

Source: Table 57

Table 58—Accredited Residency Programs, Number of Residents, and Program Fill Rates, by Specialty, 1975 and 1980

Specialty	1974-1975			1979-1980		
	Number of Accredited Programs	Number of Residents	Percent Positions Filled	Number of Accredited Programs	Number of Residents	Percent Positions Filled
Total	4,640	52,685	91%	4,673	64,615	94%
Anesthesiology	158	2,044	90	163	2,491	89
Family Practice	230	2,669	80	385	6,352	91
Internal Medicine	425	11,024	97	445	16,580	97
Obstetrics/Gynecology	325	3,421	94	306	4,496	96
Orthopedic Surgery	183	2,375	97	181	2,572	100
Pathology	459	2,835	83	359	2,519	89
Pediatrics	257	4,784	96	253	5,603	99
Psychiatry	256	4,370	87	232	3,901	82
Radiology, Diagnostic	159	718	80	262	3,069	99
Surgery	415	7,354	94	352	7,689	90
All Other	1,773	11,091	89	1,735	9,343	93

Source: American Medical Association: Medical Education in the United States, 1975-1976. *JAMA* 236:2977, December 27, 1976; Medical Education in the United States, 1979-1980. *JAMA* 244:2829, 2830, December 26, 1980.

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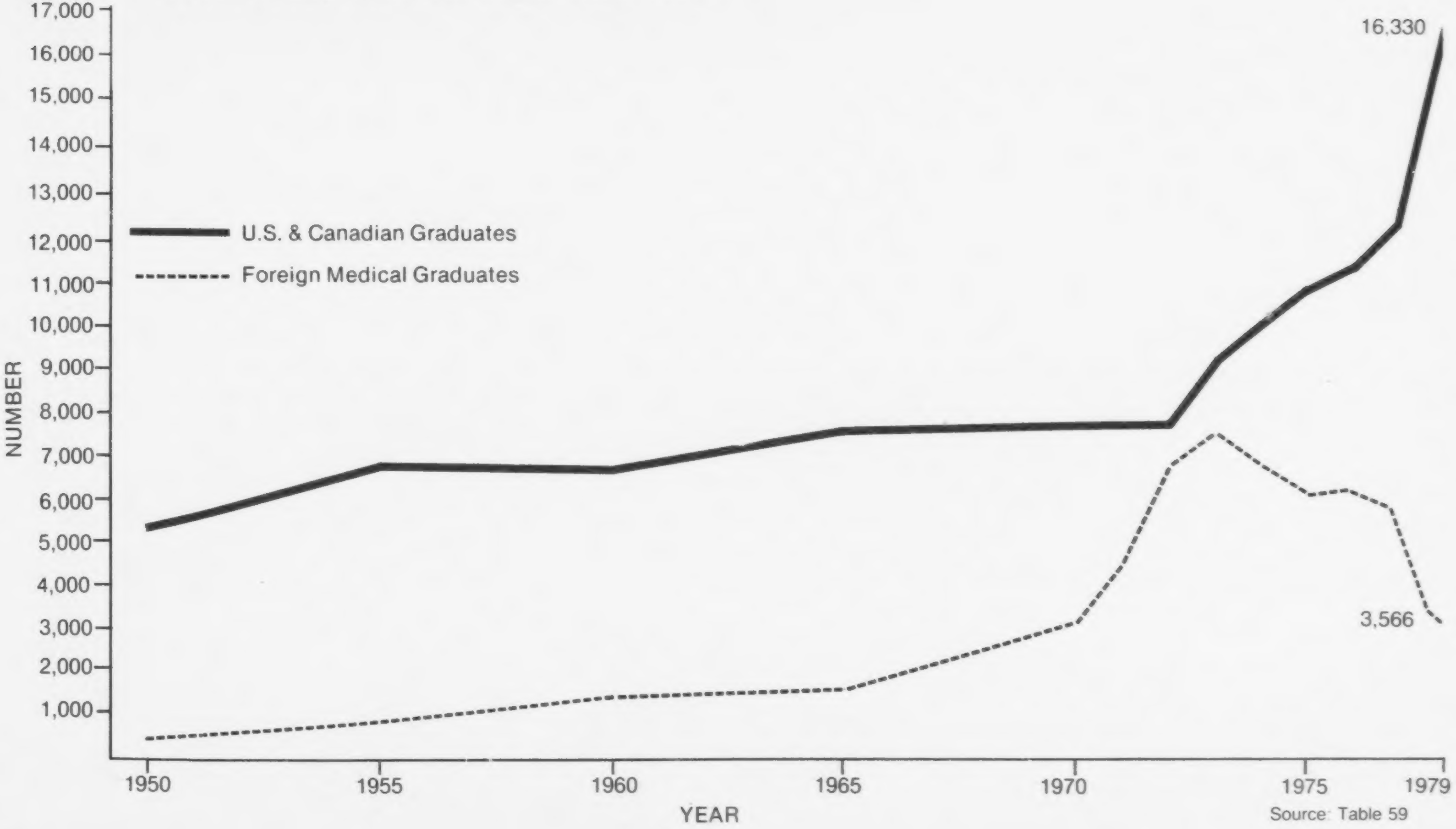
Table 59—Total and Foreign Medical Graduate Licentiates Representing Additions to the Medical Profession, Selected Years 1950-1979

Year	All Graduates			Foreign Medical Graduates		
	Total	Examination	Endorsement	Total	Examination	Endorsement
1950	6,002	4,609	1,393	308	267	41
1955	7,737	6,211	1,526	907	881	26
1960	8,030	6,225	1,805	1,419	1,383	36
1965	9,147	5,699	3,448	1,528	1,468	60
1970	11,032	6,729	4,303	3,016	2,830	186
1971	12,257	7,743	4,514	4,314	4,131	183
1972	14,476	9,760	4,716	6,661	6,442	219
1973	16,689	10,752	5,937	7,419	7,247	172
1974	16,706	9,916	6,790	6,613	6,425	188
1975	16,859	8,990	7,869	5,965	5,838	127
1976	17,724	9,598	8,126	6,436	6,330	106
1977	18,175	8,836	9,339	5,851	5,790	61
1978	19,393	8,131	11,262	4,578	4,540	38
1979	19,896	7,931	11,965	3,566	3,522	44

Source: Wunderman, L. E.: Physician Distribution and Medical Licensure in the U.S., 1979. Chicago: American Medical Association: 361-362, 1980.

Figure 25—Licentiates Representing Additions to the Medical Profession, Selected Years 1950-1979



Source: Table 59